# JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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## EDITORIAL NOTES—GAS, &c.

### Principles and Practices under Examination.

WHEN a long-established process is attacked by revolutionaries with more or less improving success, there is certain to be disagreement among the masters as to the soundness of the new principles and practices. When "doctors" disagree, who, it may be very fervently asked as well in relation to carbonization as to any other subject, shall decide? The methods of carbonizing coal for the primary purpose of gas making have of recent years been attacked from several quarters; and we have to-day the vertical retort (both on the continuous and the intermittent system), retorts inclined at an angle of 45°, the Munich chambers, and bye-product coke-ovens—each and all offering themselves as possessing virtues that constitute them the superior of the old systems of carbonization, and each having peculiar merits that make it the superior of the other modern productions. That for the man who has to pass judgment on them and pronounce his preference, is bad enough; but, under such circumstances, choice can be made on practical result alone. The gas engineer and manager has to examine all new systems very much from the commercial standpoint—giving consideration to the initial and maintenance costs, to working costs, to productive results, and to the value of the gas and the bye-products. To a large extent, all else is more or less of academic interest; but among the student gas engineers and managers of all years, there is a strong partiality for knowing the why and the wherefore of things. Those who look into these questions from the very love of getting to the bottom of matters, will have observed of late that we have reached the point now when the principles of the new carbonizing systems that offer themselves are being somewhat strongly attacked from different quarters, but chiefly, though not altogether, on merely theoretical considerations. When this stage is reached in the development of well-ordered schemes for revolutionizing something that is old-established, then we may look for still further interest from those whose business it is, if they are not content to rest on the laurels of practical results alone, to defend the principles of the process to which they have attached name or faith, or both.

Those who have read the articles and papers on the new carbonizing methods that have appeared in the "JOURNAL" during the past two months, leaving out of account the papers, &c., read at the annual meeting of the Institution of Gas Engineers, will have noticed among the contributions a strongly constructed case by Herr Kobbert against the practice of using the Dessau vertical retort in the latter hours of the period of carbonization—the eighth to the tenth or the ninth to the eleventh as the case may be—as a water-gas generator, and giving reasons for preferring an independent plant for the purpose. It will also have been noticed that M. Sainte-Claire Deville, whose researches into carbonization are among the masterpieces, has been making an onslaught on the theory of the Dessau vertical retort workers, that the gas as it is evolved from the coal in the process of carbonization takes its passage through the centre cooler core of the vertical charge. The Munich carbonizing chambers have also been brought to the front again; and in a paper by Herr Reis, of Munich, there has been his defence against an attack made some time back by Dr. Bueb on the principles and practices incorporated in the Munich setting. And, to go a point further, the Koppers inclined coke-ovens have been introduced afresh as possessing for the gas maker something exceeding altogether anything extant in the way of carbonizing process. But when claims and figures come to be tested by the aid of experience, doubt continues to dilate.

Here it is impossible to go in detail into the various disagreements with principles and practices to which reference is made above simply by way of illustration. But just a few points may be stated. The results of the examination instituted by Herr Kobbert into the question of the cost of the admission of steam into the Dessau vertical retort were published in our columns last week, and were founded on figures presented by Herr Prenger regarding the working of the verticals at the Cologne Gas-Works—the object of the investigation being to find out whether it is preferable to admit steam for the making of water gas in the retorts themselves during the last two hours of carbonization, or to produce in independent plants water gas for passing through the retorts. Dr. Colman has raised the same question in the "JOURNAL;" but he did not go farther than to suggest that on inquiry, it would, in his opinion, be found advisable to adopt independent plant. If we could afford to ignore illuminating power, as many German cities and towns are able to do, and be satisfied so long as we were (as they are) sending out a gas equal to about 5000 calories, there is attraction—taking the face-value only of the results in make and in the total heating value obtained from the volume of gas—in the system of admitting steam into the vertical retorts. Taking the Cologne figures, for example, with steam there is a make of 13,618 cubic feet of gas of 547·3 B.Th.U. per cubic foot, as against 11,931 cubic feet of 575·4 B.Th.U. without steam. The total heating value of the larger make is much more than that of the smaller. But that is a mere superficial aspect of the question. The Cologne figures go farther, and point to the use of steam in the retorts resulting in 0·87 less make of coke per cent. of the coal carbonized, while 1·63 per cent. more is used for heating the retorts. That is not all. There is the time occupied in utilizing the retorts as water-gas generators, during which time there is deprivation of use as coal gas producers, and their efficiency for the latter purpose is being temporarily disturbed, partly accounting for the additional quantity of fuel that is required. But if the time that the retorts are being utilized for water-gas generation, and the retorts are not available for coal gas making, is aggregated, and that time reduced to the capital cost involved by this system of water-gas making, then quite a new aspect is given to the question as to the relative economy of steaming the retorts or producing water gas in a separate generator. Herr Kobbert from the Cologne figures draws the conclusion that, at the present time, water gas made in vertical retorts is dearer by about 64 per cent. (as 2·65 : 1·60) than water gas made in special generators; and that is a consideration worth more expanded discussion than it has yet received. It will be remembered that Mr. R. Forbes Carpenter, in his recently issued annual report as Chief Inspector under the Alkali Works Regulation Acts, rather indicated a preference for the use of water gas than steam in the vertical retorts, and opined that some of the advantages that Professor Lewes hoped to derive from the use of blue water gas in horizontal retorts would be achievable in the verticals. However, it must be said—though this is a different point—regarding the use of steam in vertical retorts that, so far as experience on the Continent has gone (and it is now a considerable experience), there is accord in saying that there is no deterioration of the retorts within the limits of use—in fact, it will be remembered that an independent correspondent, writing in the "JOURNAL" last week, stated that the number of cracks in the Cologne retorts and benches was very small indeed, though half had been in use since June last year, and the other half were set to work two months later.

We make a break here, and shall next week refer to some points briefly alluded to earlier in this article.

## The Power and the Price at Liverpool.

THE meeting of the shareholders of the Liverpool Gas Company is never an exciting event; there being all round a placid feeling inspired by the comfortable condition of the affairs of the large concern. Prosperity hovers over it; and the administration are of the way of thinking that there is no other policy but their own that would enhance that prosperity. During last year, it will be seen, the same conditions that affected other gas undertakings also affected this one. Coal cost more, coke brought in more, but tar was not so good, and the outlook for it is not particularly hopeful. There was also a small percentage increase in the consumption of gas. The result of the trading is regarded by Mr. H. Wade Deacon, the Chairman, as being, on the whole, most satisfactory. But there is one point that suggests itself on reading the report of the meeting, and looking at the accounts, on which probably there might be more general satisfaction, if other conditions prevailed.

The increase in the quantity of gas sold last year was 2·43 per cent.; and this occurred among the private consumers (the users of automatic meters) and for public lighting. The total receipts from the sale of gas, the Chairman pointed out, showed an increase of £12,896. "In public lighting, "there was an addition of £146; in rental of meters, £273; "and of stoves £173, so that their business showed an in- "crease all round." Does it? There is not a single word mentioned here as to the power and industrial branch of the business; and this causes one to look at the revenue account for the items referring to the sale of gas. There we see two items which read: "Cannel gas per meter, at 2s. 6d. per "1000 cubic feet, £488,565;" and "public lighting, street "lamps, £29,811." From this, it would appear that the Directors of the Company not only believe in a high quality of gas, but in one price, and no special effort to cater for the power and industrial requirements of Liverpool. It has been admitted—and it was not long since—that the bulk of Liverpool gas is consumed for lighting, and not for other purposes. But if it were not for the old fetish of high illuminating power, the City of Liverpool might to-day be in the enjoyment of a lower illuminating power gas with a higher efficiency for the purposes of power, industry, and heating and cooking generally, than the heavy gas which, according to the accounts, seems to be charged at the level price of 2s. 6d. per 1000 cubic feet. As to the question of high-grade *versus* low-grade illuminating power gas for incandescent lighting, we believe the chief technical officer of the Company was quite recently in Berlin, and feasted his eyes on street lighting that did not give a bad account of a gas of about 12-candle power.

Of course, 2s. 6d. is not an exorbitant price for gas for lighting—particularly in these times; but it is not a tempting one for manufacturers using gas for purposes other than lighting. The Directors, however, in considering the question of a reduction, see no reason at the present time for lowering the price below 2s. 6d. for ordinary consumers. But it is a satisfaction to see that they are going to do the just thing by the prepayment consumers, who, for no less than eighteen years, have been paying the same price of 3s. 4d. per 1000 cubic feet, including the excess charge for use of meter and fittings. The ordinary consumers have had changes in price since prepayment meters were introduced into Liverpool. The difference (representing the excess) was 8d. at one time —that was, when the ordinary price was 2s. 8d. By now reducing the price 2d. to the prepayment consumers, reversion will be made to the 8d. difference of former times; and it is to be hoped this difference will not be exceeded in future. It was considered sufficient at the introduction of the system; and it is considered so now, though, between the periods named, the prepayment consumers have been paying more.

## Shifting the Responsibility.

THE President of the Board of Trade (Mr. Winston Churchill) has been down to Swansea, armed with authority to instruct the miners what they are to do anent the Coal Mines (Eight Hours) Bill. He has doubtless discharged his duty with satisfaction to himself, and has shifted from the shoulders of Imperial Parliament, and put upon those of the miners, the serious responsibility of "taking "effective steps to explain the Bill to people not connected "with coal mining." In other words, the President of the Board of Trade, in effect, confesses that in connection with the Eight Hours Bill there is yet work to be done, that the steps taken by the Government to explain the measure to the people of the country have not been effective, that the Government have therefore failed in justifying it in the eyes of the people, and that it is now for the miners to select more "effective steps" for explanation, and try to succeed where the Government have been unsuccessful.

There was much of the preceptor about the style of Mr. Churchill's address to the miners. Hearken to his words: "You have got to show the general public, and particularly "the poorer people in the great cities, that their interests "will not be injured in any way by this measure of relief "and, as I hold, of justice. . . . You have got to show "that this shortening of hours to within the periods of "health and proper, decent leisure is not attended by injus- "tice to any class of the population, or to the great indus- "tries of the country which are dependent upon the supply "of coal." Mr. Churchill imposes a heavy task upon the miners—a task that the Government have failed so far to handle in a manner that carries conviction. Supposing, when the measure is enshrined in the Statute Book, if it ever gets there, the miners are unable to show that it is not attended by injustice to any class of the population, or to the great industries of the country, the mischief will be done, and the remedy will be difficult, if not impossible. It is all very well for Mr. Churchill to adopt a tone and manner of speech implying the greatest sanctity of motive on the part of the promoters of the measure and of the Government. The miners have hitherto without this particular piece of legislation been enabled, among the manual workers of the country, to enjoy a very fair share of life and happiness and the good things of the world; and their strength and security have been the admiration of the less fortunate classes of the country's workers. Neither the Government nor the miners have disclosed to the country the need for any special protection; and the people of the country are not in agreement with the Government that there is the need.

But as though the miners of South Wales were not fully cognizant of the facts, or had omitted to evince a respectful amount of recognition or appreciation, Mr. Churchill also told them of the blessings that the present Government are supposed to have showered upon them, and assured them of more good things to follow. In his opinion, the proper direction in which legislation should move is not to sweep roughly away the existing safeguards, but to try to weave them into a more comprehensive system of safeguarding, which shall make them really inclusive of the whole masses of the people. "It is from this point of view that Parlia- "ment will have in the next session to approach the consi- "deration of various grades of social problems which are "ripe for attention." This is the warning that we are in for more class legislation. There can be no abiding security where legislation does not serve the general interest. But what of that, when the Government are assured that, without an abundant supply of class legislation to lubricate the wheels of their chariot, the next appeal to the country will not find them first at Westminster?

## The Airship Explosion at Shepherd's Bush.

THERE must be the greatest sympathy on all hands with those involved, in any manner, in the fatal airship disaster at the Franco-British Exhibition. Most accidents of the kind have their lessons, and are helpful for the future, in assisting to determine what should be avoided. It is from this point of view we here look at so lamentable an event. In this instance, precautions had been taken to avoid accident; and it has been suggested in the public press that there is a fairly plain indication that one of the very precautions adopted was the active cause of the terrible accident—perhaps in a measure aided by a combination of conditions which (whether the inference be true or not), now that the danger has been pointed out in such an appalling manner, can be obviated in the future.

The balloon of the airship on this occasion was inflated not by the distinctive smelling coal gas, but by inodorous hydrogen gas made in a special plant on the airship ground. Hydrogen gas was preferred by Captain Lovelace for the airship on account of its lighter character, just as aëronauts prefer coal gas to carburetted water gas on account of the heavier specific gravity of the latter. The hydrogen gas being inodorous, would allow of a fairly considerable accumulation of gas in the airship marquee without detection. No naked lights were permitted in the building—safety, it was considered, being amply provided for by electric lamps.

Special circuits, it is stated, were arranged for these; so that, in the event of any accident to the marquee, the current would be cut off. In addition, an electric fan was fixed in the marquee, with the view of keeping the air in circulation and preventing accumulations of gas. It is declared that it is just possible this extra precaution really produced the disaster; but until the inquiry by the Coroner (Mr. Ingleby Oddie) ends, there cannot be—if then—any positive statement on this head. However, the electric fan was driven by a small motor; and it is intimated that the only possible means of ignition could have been from a spark from this source. The Coroner also states that at the time of the explosion one of the victims was at work on the electric light wires. It has been ascertained beyond all doubt that no one was smoking inside the tent—in fact, the Coroner himself finds no reason to suppose anybody was smoking. The structure, too, was so far removed from the fence of the enclosure that a carelessly thrown match could not have reached it, nor is there any suggestion of sparks from a neighbouring factory. Whether or not this occurrence was occasioned by the ignition of the hydrogen gas by a spark from the electric motor, it does suggest that electrically operated motors and fans had better be kept well clear of places where there are likely to be accumulations of gas, and that, in the cause of safety, it would be wise to impart some distinctive odour to hydrogen gas made by independent plants of the kind used here, and stored in such fragile structures as balloons.

The inquest on the two victims of the disaster has been adjourned to the 7th prox.; but meantime it is interesting to learn that, though at first the Coroner could not understand how the ignition came about, he is not without hope, on further inquiry, of coming to a satisfactory and definite conclusion. What the Coroner's own views are have not, of course, yet been made public; but there will be full agreement with him that it will be a melancholy satisfaction to know that two lives have not been lost in vain, if the loss has led to the discovery of a danger which may be averted in future. Here we do not intend any prejudgment; but whether or not the danger at which the Coroner hints is that of the use of electric motors where there is the possibility of gas accumulations, as in this instance, it must be admitted that there is here, unless the motors are gas-proof cased, a potential source of mischief which can and certainly should be avoided.

## "The Times" and Gas Exhibits.

It is a singular thing that since the advent of the "Engineering Supplement" in "The Times," that august purveyor of the news of the day has not been able to touch gas or electrical affairs without disclosing a marked bias for things electrical, and an incapacity for dealing with these subjects intelligently without allowing that disposition to blur the independence on such a subject of a paper of the position of our daily contemporary. An article appeared on Friday, purporting to treat of the gas exhibits at the Franco-British Exhibition; but it seems to have been impossible for the writer to deal with the subject without invidious comparison. In parts, he does give credit to gas, but invariably with some qualifying remark. Here is an instance. The writer is impressed with the fact that "those interested in the manufacture and use of gas have achieved a remarkable degree of success in the task of rendering available to their consumers *as many as possible* of the advantages and conveniences inherent in the younger rival." The reader is left here the plainly intended deduction that there is still a balance of advantage on the side of electric lighting which it has been impossible for gas to overtake. But there is silence as to the balance of advantages on the side of gas which electricity has failed to reach. The compliment in the quoted passage, with obvious purpose falls short of desert. Then, again, it is said: "For purposes of heating, various gas-stoves are on view, from complicated kitchen ranges down to small ornamental forms suitable for occasional use in a bedroom. Here the friends of electricity will be disposed to think that, on the whole, they can hold their own, and can supply equally convenient apparatus for such purpose." In the first place, why "complicated" kitchen ranges, when such popular conveniences are as innocent of complication as anything can be, are simplicity embodied, and are he antithesis of the fearfully and wonderfully made constructions that the electrical industry offers for the purposes of heating and cooking? The friends of electricity must be blind to unpliant fact if they think they can hold their own with gas heating and cooking appliances with apparatus of great initial cost, great relative expense in running costs even with electricity at 1d. per unit, and apparatus (considering its cost) of poor thermal efficiency. "A weakness of gas" is said to be suggested by the presence of an electric fan in the kitchen of the combined gas exhibit at Shepherd's Bush. The conditions in this kitchen, for the purposes of demonstration, are abnormal; and there is nothing really suggestive of any weakness under the circumstances. Normally, such an aid to ventilation is not needed. But, while the writer of "The Times" was making comparison, he might have drawn attention to the fact that the spinning punkahs and fans in the electrical exhibit have been found extremely useful in mitigating an obvious weakness of electric lighting—that is, the stuffiness and stagnation that are invariably felt in rooms where such lighting is the vogue. Further, in referring to the laundry equipment, the writer of this article on the "gas exhibits" mentions that, even in such a case, many people would prefer an electric motor if it were available, and the electric iron is by no means without its advocates. Laundry people have to consider cost and heating efficiency; and surely the writer of this peculiar article will not suggest that the electric iron is an efficient article contributing to economy, nor that it is an invariably safe one in the hands of laundry workers or domestics.

## Sympathy and the Material Evidence.

One of the very pleasing features of the adoption of co-partnership in gas companies has been the unreserved exhibition of sympathy of the ordinary proprietors with the men in their employ. In no case when the schemes for co-partnership have been put before the proprietors by the Boards has there been, so far as we have been able to ascertain, any hostility on the part of any of those who have to give their endorsement before the system can have existence. The Bournemouth stockholders, at their meeting on Friday, were an example of the others. When the scheme was proposed, there was not the slightest criticism. Two or three inquiries were made for the purpose of adding to information; but nothing more. The righteousness of the plan that gives the men an opportunity of putting by for later life—an opportunity that the so-called "living wage" does not in most cases really give—cannot be the subject of controversy; for though all do not concede the opportunity, few there are who do not feel how weak would be opposition, and how any manifestation would recoil upon themselves. Even the question of cost cannot stand in the way of acceptance. In the case of the Bournemouth Company, in the past ten years the consumption of gas has risen by 177 per cent.; and the sale of water by 39 per cent. The proprietors and the consumers have reaped the advantages of prosperity; and there is scope for now affording the men the £1600 or so per annum that the scheme will cost. Much of this will be saved in more ways than one. The scheme must largely influence a majority of the men; and these men will influence those who are less impressionable, the shirkers, and others. The adoption by the Bournemouth Company is interesting. It is the first gas and water company to apply the system; and the scheme in this case provides for the distribution of the bonus on the following scale: If the price of gas in the Bournemouth district is at or above 3s. 2d. per 1000 cubic feet, no bonus; at 3s. 1d., 1 per cent.; at 3s., 2 per cent.; at 2s. 11d., 3 per cent.; at 2s. 10d., 4 per cent.; at 2s. 9d., 5 per cent.; at 2s. 8d., 6 per cent.; and so on. In this Company, no less than in the case of others that have adopted the scheme in one form or another, we say with confidence it is in the right hands for making it an abundant success.

## The Position of Tar in Canada.

Of the half-dozen short papers which occupied the attention of the members of the newly-formed Canadian Gas Association at their first annual meeting, recently held in Toronto, it is gratifying to find that by no means the least useful one was contributed by a new-comer into the Dominion. In another part of the "JOURNAL" will be found the paper referred to, the author of which was Mr. John Keillor, the Engineer and Manager of the Hamilton (Ont.) Gas Company. Mr. Keillor, who is a member of a family of gas managers—one of whom, it may be remembered, read an interesting paper on "High-Pressure Distribution" at the meeting of the North British Association last month—was

formerly Manager at Peterhead, and went to Hamilton about two years ago. On his arrival he found himself face to face with a question which has troubled not a few of his colleagues on this side the Atlantic—viz., the disposal of tar to the greatest advantage. He found the tar business in the hands of a "combine," who dictated to the gas companies what prices they would pay for their crude product. The absence of competition necessarily caused a "slump" all round. Mr. Keillor, with the shrewdness and activity of his countrymen, quickly recognized this, and set himself to work to remedy the existing condition of things. When the Company's tar contract expired, and the distillers asked for its renewal on less favourable terms, Mr. Keillor gave them a piece of his mind, and specified clearly the terms on which he was prepared to close with them. These were that they should take his entire output on a sliding-scale basis for five years—the variations in price to correspond with the rise and fall of the price of coal on the one hand, and the price of tarred felt, pitch, refined tar, &c., on the other. While admitting the fairness of this proposal, the distillers declined to depart from their old-established practice of buying on their own terms. The result was that the contract was not renewed; and the Gas Company put in plant for distilling and refining their tar, and for the manufacture of tarred felt, &c. After its installation they, of course, had absolute control of their output. Mr. Keillor put this before his colleagues as the "panacea for all the ills that are likely to arise between the avaricious tar distiller and the gas company." Of course, he recognized that in the case of small works it might not pay to erect tar-distilling plant; but he suggested that the entire gas industry was large enough to do so. He thought it was the only natural sequel to the long series of chemical operations carried on in gas making that the residual tar and ammoniacal liquor should be dealt with to the best advantage by the producers themselves. He acknowledged that this ideal might seem to some to be a little chimerical. Personally, however, he was confident it was quite possible of attainment. How this is to be done is now under consideration by his colleagues.

### The Value of an Official Auditor.

If any of our readers have ever felt inclined to question the value of the investigation of the accounts of local authorities by Auditors of the Local Government Board, we would direct their attention to a report recently issued by Mr. D. M. Propert on the result of an inquiry he conducted in regard to the parish of Gelligaer, near Cardiff, as it furnishes examples of maladministration in conducting the affairs of the parish for which it would be difficult to find an equal in the archives at Whitehall. The report occupies three books of foolscap size, and contains some comments of a very outspoken and severe character by the Auditor, who has surcharged items to the total amount of £4547, of which £2364 is against members of the Council, and £1264 in respect of receipts and payments. The portion of the report dealing with the disallowances occupies 73 pages. One item is an amount of £6 18s. 6d. off the account for 35,000 cubic feet of gas, which is characterized by Mr. Propert as "grossly excessive," seeing that for the corresponding quarter of the previous year, under identical conditions, the consumption was only 6600 cubic feet; and in the case of a disallowance of £12 13s. 9d. from another account in respect of gas and water, he expresses the opinion that "the consumption of gas was most excessive and extravagant," and that it "could not posssibly have been burnt in the offices." There were "grave irregularities" in the wages accounts coupled with "culpable negligence;" and "gross carelessness" was displayed in signing cheques for wages without calling for accounts. In the making out of the valuation lists, a scandalous state of things was disclosed at the audit. Though fifteen months had elapsed since the issue of instructions for the preparation of the lists, and £190 had been drawn on account of the work, there was absolutely nothing to show for this expenditure. These are just a few of the instances of negligence, amounting to misfeasance, cited by the Auditor. In his general summing up, he says the finances of the Council appeared to have been grossly neglected; no regard being paid by the councillors to the checking or control of the orders. From what transpired at the audit, there was ample ground for coming to the conclusion that goods for which the Council paid were either never supplied or were not used upon the works. It is not surprising, therefore, that the expenditure rapidly developed. For the year ending March 31, 1902, the calls upon the Overseers amounted to £380; while for the year ending March 31, 1907, the calls shown by the financial statement were £5500 on the general account and £561 on the burial account—a total of £6061. This was an increase of no less than £5681 in five years; and yet there was no evidence in the minute-book that any calls had been authorized by the Council on the general account or under the adoptive Acts, or that any precept had been issued. Cheques for large amounts were drawn in favour of the officers unsupported by authority or particulars. It is stated that the Assistant-Overseer used to draw what cheques he pleased or thought were required on the Overseers' account, and pay them into the Council's account. The Auditor says that though only those who signed cheques had been surcharged, every member of the Council was morally, if not legally, responsible for the waste and mismanagement which were permitted to go on unchecked and unheeded. The excuse put forward by these gentlemen was that they had implicit confidence in their officers. But the Auditor says nothing could justify the "apathy, gross negligence, and absolute disregard of ordinary business methods which appeared to have characterized the proceedings of the members constituting the Parish Council." With this expression of opinion, we will leave the subject for the reflections of our readers.

## GAS STOCK AND SHARE MARKET.

**(For Stock and Share List, see p. 533.)**

Business on the Stock Exchange was, of course, quiet last week, with an occasional pleasant little show of sprightliness when the welcome buyer showed himself. But the tone was, on the whole, more favourable to prices. Home Rails, however, were a persistent exception, and unable to throw off their sensitive and depressed character. The increasing ease of the Money Market was the main elevating factor. The week was not wholly free from fluctuations; for on Monday Consols had a slight fall, while most other markets were good. This was remedied on Tuesday, when Consols recovered and fell in line. On Wednesday they were again sensitive, but picked up again next day. Friday was the best day of the week, busier and brighter, and formed a happy termination—for the Stock Exchange was closed on Saturday. Movements in Gas Stocks were a noteworthy feature of Thursday and Friday, when a considerable number of Suburban issues had a smart advance. The wonder is that in some of these the advance has been so long in coming, for they had been left standing for months at very tempting quotations to those who really know the merits of the undertakings. Even now there still remain some inequalities and inconsistencies of valuation which are quite inexplicable. The public, however, are like sheep, and "pleased to the last they crop the dainty food." The Money Market has been pretty well swamped with money—an "unemployed" that can find no job in trade, and demands an engagement anywhere at any rates. In the Gas Market, there was business at a very fair rate of pressure, considering the time of year. The bulk of it was in the leading Company; some important issues being very quiet. Gaslight and Coke ordinary was quite steady within the close limits of 97½ and 98, only one transaction being at 97⅜. The secured issues appeared to be on the rise, but their quotations were left unchanged. The maximum marked 88, the preference advanced from 105¼ to 107, and the debenture was done at 84⅞ and 85. South Metropolitan was quiet and steady. One bargain was marked special at 119¼, but general dealings were at from 119¾ to 121. Both Commercial capital stocks rose a point, and the 4 per cent. was done at 109½. The debenture changed hands at 81¾ and 82½. Not much business was done in the Suburban and Provincial group, but many quotations advanced, as the list will show. Brentford old was marked at 245, ditto new at 183, South Suburban at from 113¾ to 114¾, Tottenham "B" at 105½ and 106¼, and West Ham at 101½ free. Among the Continental Companies, Imperial was firmly dealt in at from 181 to 182, European fully-paid marked from 22½ to 23, and ditto part-paid 16¾. Union was not dealt in. Among the undertakings of the remoter world, Bombay changed hands at 6$\frac{8}{16}$, Buenos Ayres at 11½, Primitiva at 5¼, ditto preference at 4$\frac{15}{16}$, River Plate at 13½ and 13$\frac{7}{16}$, and San Paulo at 13$\frac{11}{16}$ to 13⅜.

**M. Féry's Direct-Reading Photometer.**—In the "Journal" for the 2nd of June last, we illustrated and briefly described a new direct-reading photometer devised by M. Féry, who some months ago brought it under the notice of the Société Française de Physique. A description of the instrument is given in the current number of the "Journal de Physique." The light to be tested is placed at the distance of 1 metre from a lens, which forms an image of the source on the receiving disc of a Boys radiomicrometer. Between the lens and the disc the light passes through a layer of water containing copper acetate, which cuts out of the beam the radiations which do not affect the eye. The instrument gives results for different sources which are stated to closely agree with those recorded by the Lummer-Brodhun photometer.

# ELECTRICITY SUPPLY MEMORANDA.

**In the Ways of the Unjust—Agreement with "Meteor"—Bad Trade a Serious Risk of the Low-Priced Power Business—Unjustifiable, if not Unreasonable, Conditions—Aerial Wiring—Fatal Voltages—Boiling Water by Electricity.**

One of the current questions that must be kept well to the fore now that the committees and officials of municipal electricity undertakings are again agitating for a greater share of the public lighting, and in fact in places for the whole of the public lighting in thoroughfares in which electric cables are laid, is that of the anomalous and altogether improper practice of constituting the Electricity Committee the street lighting authority. We have several times spoken of the impropriety of this, and of its effects; and there must be persistence whenever opportunity allows, in urging the necessity of a complete dissociation of the two departments and of entire disinterestedness of the committee in charge of the one pertaining to public lighting. A small illustration of the favouring of the municipal electricity department, to the detriment of the ratepayers, that results from this linking-up of seller and buyer comes from Sunderland. It is not so striking an illustration as there has been on certain previous occasions; but it is not necessary for evil effect to always be impressed by large illustration. At a recent meeting of the Town Council, the report of the Electricity Committee that was adopted had a paragraph inserted among its other parts authorizing the installation of twelve 100-candle power electric lamps in a road where there had been an extension of cable. The cost of these lamps is to be £52 4s. a year, and the expense of installation £34; while the Gas Company, it transpires, had offered a considerably higher candle power from half-a-dozen lamps at £14 14s. There was an attempt made at the last meeting to secure the revocation of this part of the Electricity Committee's previously adopted minutes; but the work of altering the lamps had already been commenced, so that the proposal came too late. But here there is another illustration of the importance of having the public lighting in the hands of a committee who are independent, and whose actions are above suspicion. Municipal authorities are very particular about putting the supply of their needs in most things up to tender and contract; but this does not apply to public lighting where the electricity undertaking is managed by a department of the urban authority, and the gas supply by an independent company.

Touching upon the foregoing subject, we are tempted—tempted to adopt *literatim*—a paragraph from the notes of "Meteor" of the "Electrical Times." It runs completely parallel with what has been often submitted in the "Memoranda." Here it is: "Time and again we have urged that current supplied by a municipal station to other municipal departments should be charged on commercial lines. *The electricity department should neither be subsidized by inflated prices nor penalized by being compelled to supply under cost.* Especially should this rule be observed when the other department is a commercial concern, such as a tramway. Any departure from business principles in fixing the tariff places an artificial burden on one department, and confers an undeserved benefit on the other—in each case vitiating the accounts, and rendering the financial results misleading. It is no argument to say that the money simply goes from one pocket into the other. That leaves untouched the fact that two blacks do not make a white." That is what we have been saying time and again, in dealing with the charges made for public lighting, which lighting comes upon the peak of the load. Perhaps "Meteor's" words will fall on good ground, take root, and induce local authorities not to depart from "business principles" in fixing the price, not to "vitiate their accounts," and not to "render the financial results misleading." They have in the past done many things they ought not to have done in this respect; but if they will follow sound advice in this matter henceforth, they will speedily redeem their character for plain, upright, commercial dealings as between department and department—regarding each department as a customer, and dealing with it in such a manner as the custom, through its value to the undertaking, deserves, taking neither a higher nor a lower price than is justifiable. If local authorities will do this, there will be no real ground for grievance.

In entering upon large power supply, municipal electricity undertakings run the great risk of trade depression causing a heavy burden to fall upon the ratepayers. It has been proved already that much of the burden of power supply is already packed upon the lighting consumer. If it were not so, we should not find such great differences as (say) ¾d. per unit at one end of the scale and (say) 5d. at the other—that is to say, a purchaser of 500 units for lighting purposes paying £10 8s. 4d. for what another man for another purpose is getting for £1 11s. 3d. The distinction is too great for justification. Time of day alone cannot defend such an immense difference. That, however, is not the special point of this reference; but it is a point referring to power that the present depraved conditions of trade and the nebulous prospects for the immediate future have brought within view. The Sunderland municipal electricity undertaking is in a strange position just now. The Electricity Committee have set apart for the town tramways a station that is fairly expensive to work; and they charge the Tramways Committee works and capital costs. It is not contended here that this is unfair; but, according to the 1907 returns in the "Electrical Times," the price per unit for tram traction works out to 1·69d. per unit. This tramway supply gives a constant long-hour load. But, at the meeting of the Town Council at which the Committee's annual report was under consideration, the Chairman of the Electricity Committee stated that one of their customers for power had been paying a little over 1d. per unit, and when that firm again worked for longer hours they would probably get energy at ¾d. per unit. It is an anomalous condition of things that the Electricity Committee should be able to supply outside firms for power cheaper than they can do their own colleagues of the Tramways Committee for traction. But if there could to-day be a clear division of costs, it would be found that these power consumers of Sunderland are responsible for bringing a burden upon others that is altogether unjustified. Trade has been, and is, bad in Sunderland; and the shipyards are working shorter hours. The last extension of electricity plant, involving a capital expenditure of £40,000, was undertaken especially for the power supply. Then came the slump in trade; and now little shipyard load is required. It is hoped that the demand will be rehabilitated in eighteen months or two years. Meanwhile this large unprofitable expenditure has been made specially for the low-priced electricity; and thus it comes about that the deficit on the working of the concern for the past year is £1918. There is not the slightest doubt that the loss is due solely to the power part of the business and the special provision made for it. It is the result of risk and speculation undertaken by the Corporation; but why should the ratepayers or the lighting consumers bear any part of the loss? We cannot find any legitimate reason. There has been a proposal on the Council *agenda* that a Special Committee should be appointed to investigate the position of the undertaking; but it has been withdrawn, as its proposer (Alderman Turnbull) requires to amend it. It is all very well for the Chairman of the Electricity Committee to plead that, although there is this deficit, the undertaking has made a very good dividend on the capital invested. There is no comparison between a private company the shareholders in which risk their own private money and an undertaking run on borrowed money. All financial obligations must be met before one can begin to talk about profits.

Electricity suppliers seem to like to pick and choose their custom, and to dictate arbitrarily the conditions of supply. Sometimes we know that what they do is *ultra vires*, and is contrary to the General Acts, which name the conditions on which a consumer may apply for a supply, and which give the supplier no power to supplement those conditions. The "Electrical Review" calls attention to a case in point, in which the use of the lower power metallic filament lamps, with transformers, are concerned. We have heard of urban authorities owning electricity undertakings who actually and seriously started off with the intention of making their customers who use the electricity-economizing metallic filament lamps pay more than those who use carbon filament lamps. That is foolish; while the case upon which the "Review" comments is not perhaps so unreasonable as unjustifiable. Our contemporary says that a correspondent has recommended many clients to adopt low-voltage metallic filament lamps and transformers on alternating-current circuits on account of the economies that can be effected by transforming down to 25 volts. He finds, however, that the supply authorities refuse to connect up any transformer unless it has a loss of 15 watts on open circuit. As some of the transformers have a total capacity of 200 watts only, this represents a loss in the transformer of 7½ per cent., which is, of course, going on all the time, and would reduce very materially the saving effected by the adoption of metallic filament lamps. The correspondent considers that a policy which deliberately insists upon the manufacture of inefficient apparatus is wrong, and that supply authorities, if they fear that the introduction of tungsten lamps may impair their revenue, should revise their charges, instead of insisting on a continual waste in the transformer. The point is certainly one of great interest. There appears little reason to doubt that the supply authorities have not the right to impose the conditions. But rights apart, what they ask is not altogether unreasonable. They are the victims of circumstances. "They stand to suffer a very serious loss through magnetizing numbers of transformers all day without a record being effected on the meters." The shortcomings of electricity meters, however, have nothing whatever to do with the electricity customer; and he sees no sane reason why he should be made to suffer loss through these shortcomings. The unfortunate thing is that neither do the electrical suppliers see why they should suffer loss. But they are in the hands of the consumer; and there is no escape, unless the consumer chooses to be voluntarily generous. There is the alternative, under the new conditions, to raise the price of electricity to such a degree that losses through inefficient appliances may proceed on the premises of the consumer at his pleasure.

It will be remembered that Mr. A. A. Voysey, the City Electrical Engineer, in a report upon which we commented on June 16, recommended the City Fathers to reduce the mesh of the wire cobweb over City streets by adopting central suspension for electric lamps by cross wires throughout the streets. There are very good reasons—principally on the score of safety, and the objection to putting obstacles in the way of the Fire Brigade—why the City Fathers should not adopt the ill-considered advice of their Electrical Engineer, who has quite naturally a bias for electricity. If anything were required to satisfy as to error beyond the obvious disadvantages to such cross-wiring as proposed, consideration might be suggested of a number of statistics that have been published regarding existing overhead wires in the City.

They alone form a sufficient danger; and we fail to see any necessity for intensifying it. There are now 155 owners of lines in the City. A total of 733,200 spans of wire cross the public thoroughfares. There has been a net increase of 1211 miles of National Telephone Company's wires. Although the exchange telephone systems of the Post Office and the National Company have been greatly extended, there is a constant addition to the number of private direct lines. Last year 2797 complaints of broken wires and other contraventions of the bye-laws were made and rectified. There is sufficient in this return to make the Corporation pause before they increase the overhead wire dangers of the City in the wholesale manner suggested by Mr. Voysey. What with the addition to the multitude of wires above the streets, and with the multitude of motor cars on the roadways, the City is growing more and more an undesirable place for pedestrians.

The Chief Inspector of Factories and Workshops will have two more fatalities at common voltages to add to the roll when he comes to write his report for the current year. A lad of 17 met with his death early this month in the locomotive shed of the Pinxton Colliery, Limited. A witness stated that the deceased suddenly cried out while he had hold of the cable of a portable electric lamp. It is believed the lamp had been tampered with; but the principal point to note is that the main pressure was, according to the evidence of the Company's electrician, 230 volts, and the utmost that could have passed through the body of the deceased would be 145 volts. At the Harton Colliery, on a recent day, a number of men were waiting at the bottom of the shaft for the cage to elevate them, when one of them—W. S. Young—put his hand on a tube enclosing electric wires. The tubing has, evidently through violent treatment, had to be frequently repaired. After the accident, it was found snapped in two places, the rough ends had cut through the insulation, and thus made the broken tube alive—good contact with tube and earth making 220 volts a fatal pressure for the victim.

Attention has been called to a new electrical kettle, costing 18s. 6d., which is a very long price, seeing that it has only a capacity of 1½ pints. The relation of first cost to capacity is one interesting feature. Another is that 500 watts will bring the full contents—1½ pints of water—to boiling point in nine minutes. The wattage, the contents, and the time appear to have a disproportion of a kind that will not recommend. The kettle is not alone in newness. There is a cheaper form of 1¾-pint capacity, made in polished copper, which at a 450-watt rate will boil in twelve minutes. But in places where such a quantity as 6 pints of water is required at one time, by using 1300 watts, or 1¾ units of electricity, it can be obtained. It will be seen from the above that about half a unit of electricity is required to boil 1½ to 1¾ pints of water; and it will depend upon the price per unit at which this class of custom is met, whether or not it is cheap to boil water by means electrical. If the load-factor, and all those scientifically precise conditions are taken into account that are supposed to be considered with the utmost reverence in determining the prices to be charged for electricity——well, then, the price per unit for electricity for the boiling of kettles would be altogether prohibitive.

## Vienna Municipal Gas-Works.

The report of the working of the Vienna Municipal gas undertaking for the past year states that the quantity of gas made amounted to 100,870,230 cubic metres (about 3,562,333,000 cubic feet); being an increase of 4,520,580 cubic metres, or about 4·7 per cent., on the make in 1906. Over 7 million cubic metres (247,200,000 cubic feet) of gas were consumed for public lighting. The unaccounted-for gas was about 2 per cent. of the make. The highest make of gas in twenty-four hours occurred on the 20th of December last, and was 519,450 cubic metres (18,344,900 cubic feet). The total amount of coal consumed in the year was 284,646 metric tons. On the average, 889 retorts were kept in action. The total length of mains on the 31st of December last was 688 km. (428 miles); and on the same date there were 22,118 burners (all incandescent) in use in street-lamps. The transition from differential prices for gas for lighting and other purposes to a uniform price for all uses, which came into effect at the beginning of the year, naturally did away with a large number of meters on dual supplies, and it also resulted in the profit of the twelvemonth's working being slightly less than in the previous year. For the past year the profit amounted to 3,799,507 kronen (about £158,312). After setting aside sums for the insurance, pension, and redemption funds, an amount of 2,941,682 kronen (£122,570) was handed over to the municipal chest.

An account has been forwarded to the Editor of the Engineering Supplement to "The Times" of a novel exhibition of the use of natural gas which was demonstrated in the United States a few weeks ago on a half-mile race course, when a small motor-car was driven three miles, using natural gas as power. The test is stated to have shown conclusively that automobiles can be driven by natural gas. The total amount of gas used in running the car for the three miles was about 10 cubic feet. At 15 c. per 1000 feet, the cost of this amount would be 3-20ths of a cent, or 1-20th of a cent per mile. Our contemporary has been informed that arrangements are being made for the shipment of this gas to England to sell at 25 c. per 1000 cubic feet.

# OBITUARY.

### WALTER WILLIAM FIDDES.

We regret to record the death, at his residence, "Ferndale," Bishopston, Bristol, on the 15th inst., after a long and painful illness, of Mr. Walter William Fiddes, whose name is closely associated with the Gas Company supplying the western port.

Mr. Fiddes commenced his professional work in 1862 or 1863 as articled pupil to his father, Mr. Walter Fiddes, who was then the Chief Engineer of the Bristol Gas Company. Early in his career he was selected out of several candidates for the position of Engineer to the Calcutta Gas Company; but, at the request of his Directors, he declined to accept the post, and remained with the Bristol Company in the capacity of Assistant-Engineer. He occupied this position until 1888, when, owing to the retirement of his father, he was appointed Chief Engineer, and held the post until 1901, when, owing to failing health, he found it necessary to retire. During the time he was associated with the Company, numerous important extensions were carried out—notably the construction of the large gas-works at Stapleton Road. After his retirement, his connection with the Company was not entirely severed, as he acted as their consultant when requested.

Mr. Fiddes, it will be remembered, was the inventor and joint patentee with Mr. J. G. W. Aldridge, of the Fiddes-Aldridge simultaneous charging and discharging machine for gas-retorts. He was also the inventor of the ram method of discharging horizontal through retorts. He was keenly interested in scientific research, and carried out extensive coal tests, which were tabulated and published in Mr. Newbigging's "Handbook," as well as in "King's Treatise on Coal Gas." He was for years a prominent member of the Bristol Microscopical Society, and also of the Bristol Naturalists' Society. He was an expert on all matters appertaining to his profession, and ever ready to help others with his knowledge and experience. He was a contemporary with Methven in the discovery of the standard of light which was afterwards called the "Methven Screen." To his skill as an engineer, he added artistic ability of no mean order; and he was a lover of all things appertaining to art.

Mr. Fiddes was a member of the first Institution of Gas Engineers; and at the meeting in 1896 he read a paper on "The Application of the Expansion of Fluids to Correct Measurement of Gas Passing through Meters," in which he described an arrangement devised by him, and patented in conjunction with Messrs. W. & B. Cowan, Limited, by which the effect of temperature in altering the bulk of gases was so employed that as the temperature varied the quantity of gas passed by the meter at each operation was automatically changed. The subject of the paper was, in fact, the temperature aspect of the question of unaccounted-for gas, which has within the past few weeks acquired fresh interest. He passed, in due course, into the present Institution, of which he was a member at the time of his death. He was also a member of the Institution of Civil Engineers—having been elected on Dec. 1, 1896.

### FRANCIS HERBERT WENHAM.

The death occurred recently, at Folkestone, at the advanced age of 85, of Mr. Francis Herbert Wenham, the inventor of the well-known shadowless lamp bearing his name, which some years ago —prior to the advent and general adoption of the incandescent system—was largely employed in gas lighting. The history of this lamp may be briefly summarized. Early in 1882, Mr. Wenham took out a patent for a regenerative gas-lamp; and he followed this up later in the year with one for a lamp with an inverted annular burner, in which the flame heated the air supplied to support the combustion of the gas. In April, 1884, and February, 1885, improvements in the lamp were the subject of patents; and in 1886 the lamp was further improved with the view of preventing any carbonaceous deposits in the burner. In February, 1889, another patent, bearing upon the lighting arrangements of the lamp, was taken out; and this appears to have been the final stage in the way of improvement. In 1884, a Company was formed, with a capital of £50,000, in £10 shares, to acquire and work Mr. Wenham's invention—Mr. J. H. Sheldrake being the Managing-Director. Extensive premises were taken in Rathbone Place, Oxford Street, for the manufacture and sale of the lamp, which had been favourably reported upon by Dr. Hopkinson and others. It also gained a gold medal at the Inventions Exhibition. Arrangements were subsequently made for the acquisition of the lamp patents of Mr. Frank W. Clark, who, with Mr. Thomas C. Hersey, became identified with the Company. The next steps were an amalgamation with the Anglo-Continental Gas-Lamp Company, the alteration of the title to "The Wenham Company, Limited," with Mr. W. Edgar Fisher as Managing-Director, and the opening of branches in Paris and Berlin. The business had by this time outgrown the capacity of the establishment in Rathbone Place; and consequently extensive premises in Upper Ogle Street, Fitzroy Square, were taken—the old works being kept on as show-rooms. At a later period, the business was removed to Bloomsbury Street, where, for a time, it was carried on by the Lighting Corporation.

Mr. Wenham, who was the son of an Army surgeon, developed in boyhood decided mechanical tastes; and at the age of seventeen he entered a marine engineering firm as pupil. Upon the

completion of his term, he made a series of experiments on high-pressure steam in tubular boilers for marine engines. The outcome of them was that he designed and, with the assistance of two mechanics, built on a backwater of the Thames a small steamer working at a pressure of 300 lbs. per square inch, instead of the average maximum of 60 lbs. adopted at that time. He adapted to this steamer a greatly improved type of marine engine. In the year 1853, the vessel was taken out to Egypt, and Mr. Wenham, accompanied by the late Mr. F. Frith, of Reigate, and two friends, made a trip up the Nile as far as the Second Cataract, and subsequently entered upon an extended tour for photographic purposes in the Holy Land. On his return to England, he was appointed the Director of the Panopticon of Science in Leicester Square—an institution of popular recreation which after a short career gave place to the present Alhambra. Mr. Wenham next entered into partnership with an engineer at Battersea, and designed a gas-engine which was considered to be the first of its kind in this country. On the patent for the invention being found to conflict with a prior engine, the manufacture was discontinued, and Mr. Wenham then worked out and patented a hot-air engine, which, on discontinuing his partnership and entering into business on his own account, he raised to a high state of perfection. Several of these engines are still in use for pumping purposes. His next important invention was that of the compound principle in marine steam-engines, by the use of an auxiliary cylinder for superheating steam. In 1870, Mr. Wenham withdrew from the engineering business and accepted the position of Scientific Adviser to the firm of Ross and Co. Having, while engaged in engineering pursuits, given much attention to the science of optics, he was able to make many improvements in the microscopes and accessories produced by the firm, with whom he remained for ten years. It was while he was in their service that he invented his gas-lamp. He was on the Council of the Aëronautical Society, of which his old friend, the late Mr. James Glaisher, F.R.S., who was Chairman of the Barnet and Harrow Gas Companies, was President. For many of the particulars contained in this latter portion of our notice of Mr. Wenham's career, we are indebted to the current number of the "British Journal of Photography."

Mr. Wenham had for some time previous to his death lived in retirement at Woking, where he devoted himself to carrying out mechanical experiments.

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The death occurred recently, in his 76th year, of Mr. SAMUEL WAITE, who was for forty years associated with the Lambeth Water Works—for the first eight at the Brixton Hill station, and for the remainder at the Long Ditton station, of which he was the Superintendent. During his long term of office he gained the esteem of the Company and of their successors, the Metropolitan Water Board, as well as the good-will of the employees. He retired about two years ago, and went to reside at Surbiton, where he died.

It is with great regret that we learn, through the "Journal für Gasbeleuchtung," of the death on the 17th inst. of Herr JULIUS NOLTE, the General Manager of the New Gas Company of Berlin. It will be remembered that Herr Nolte was unable, through illness, to occupy the chair at this year's meeting of the German Association of Gas and Water Engineers, of which body he had been President for the last two years. His genial presence at the meetings of this and kindred bodies on the Continent will be greatly missed. Deceased was in his 50th year.

We regret to record that the illness which compelled Mr. HERBERT B. GREEN some months ago to relinquish his position as Assistant to his father, the Engineer, Manager, and Secretary of the Preston Gas Company, terminated fatally on the 11th inst., in his 45th year, at the house of Mr. Henry Green at Preston. We are sorry to learn that the latter has for some time been lying seriously ill; and at the recent half-yearly meeting of the Company a resolution was passed expressing high appreciation of the value of his long continued services to the Company, and sympathy with him in his illness. Welcome as this resolution doubtless was, the recipient's sufferings, mental and physical, were unfortunately intensified next day by the loss above recorded. We offer Mr. Green our sincerest sympathy in his painful illness and bereavement.

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**Classes in "Gas Manufacture" in Birmingham.**—In the new session of the Birmingham Municipal Technical School, which will open on the 14th prox., special classes will be formed for the study of "Gas Manufacture," with the object of preparing candidates for passing the examinations held by the City and Guilds of London Institute. The Lecturers will be Dr. W. B. Davidson for chemistry, and Mr. W. G. S. Cranmer for engineering. The lectures will be delivered on Thursday evenings, from 7.15 p.m. to 9.30 p.m.; and there will be practical work in chemistry on alternate Wednesday evenings. The syllabus for each grade is very full; and the demonstrations and exercises in practical chemistry should prove most helpful to students. Moreover, the fees are very moderate. Programmes giving further particulars in regard to these and the other classes held at the School may be obtained from the Secretary, Mr. George Mellor, at the offices, Suffolk Street, Birmingham, at the price of 2d., or 5d. by post.

## LONG DISTANCE HIGH-PRESSURE GAS SUPPLIES.

At this year's Meeting of the Austrian Association of Gas and Water Engineers, Herr V. Schlegel, of Berlin, read a paper on the different modes adopted for carrying out high-pressure gas supplies from central works to distant townships. His paper has been reprinted in the official organ of the Association—the "Zeitschrift des Vereines der Gas- und Wasserfachmänner in Oesterreich-Ungarn"—from which the following is taken.

After referring to the first high-pressure long distance gas-main laid on the Continent—namely, that at St. Gall, in Switzerland, in 1902, the author goes on to classify the methods in which similar high-pressure supplies may be carried out, with examples from existing installations of each. He divides the systems into three main classes: (1) Those in which an equalizing or relief gasholder is used; (2) those without such a holder; and (3) those with both gasholder and high-pressure governor. Of the first class—*i.e.*, those with a gasholder—he makes two divisions. The first division comprises installations in which there is a special pressure main; and of these the author makes two subdivisions—viz., firstly, those where the pressure is obtained without mechanical means, as, for instance, by the holder pressure, or by taking advantage of the difference in height of the two ends of the main. The main by which gas is conveyed to the elevated town of St. Gall from the relatively low-lying works on the Lake of Constance is an example of this class. The second subdivision comprises mains in which the pressure is obtained by mechanical means; and of this instances are afforded by the high-pressure supplies given by the gas-works at Lubeck, at Lichtenberg, and at Budapest. The second division of the first main class consists of suction mains drawing at a distance off an ordinary distributing system. An instance of this type is afforded at Kalk. The second main class—*i.e.*, installations without a special gasholder—comprises two divisions. The first, being installations in which there is a special pressure main, he subdivides into those where the increase of pressure is obtained without mechanical means, as, for instance, at Crefeld; and those in which the pressure is raised by mechanical means, as, for instance, at Mülheim, in the Ruhr district, and at Mariendorf (Berlin). The second division of the second main class consists of installations in which there is not a special pressure main, and an instance is quoted at Schaffhausen. The third main class—*i.e.*, systems in which a special holder is combined with a high-pressure governor, is illustrated by the supplies at St. Margarethen and at Soden-Salmünster.

The author points out that the choice of systems for a particular installation must be mainly determined by the size of main which will be used. The capital expended on the main is relatively large in comparison with that required for the compressors or blowers and governors. It has hitherto been the practice to calculate the size of main required according to Pole's formula; but experience has shown that the actual loss of pressure in the high-pressure main is 5 to 10 per cent. less than that given by the formula. Hence if the formula is followed, there is an ample reserve of capacity. The author is of opinion that where a special holder is installed in connection with the high-pressure supply, the holder should be regarded as increasing the storage capacity of the gas-works, and the whole of its cost should not be charged to the special high-pressure system. The plant ordinarily required for a high-pressure supply to a distance includes the compressors or blowers, the high-pressure main, and either an equalizing or relief gasholder, or a special governor. Further, in order to ensure safe conditions of working, it is necessary to have an apparatus which automatically stops the pumping of gas into the holder as soon as the latter has reached a predetermined height. Also, there should be a safety governor which provides for adequate pressure in the distributing mains and which prevents the holder being drawn right down. Oil washers for the extraction of naphthalene, and apparatus for evaporating spirit into the gas, are generally required, because the presence of naphthalene and the formation of ice may become sources of danger in working the high-pressure gas system.

This system of supplying gas to small communities at a distance from existing large gas-works is, in the author's opinion, well worthy of extended adoption, inasmuch as it overcomes the high cost attendant on the laying of the relatively large gas-mains required for a supply at ordinary pressures. But the system may also be applied in cases where an ordinary low-pressure supply main has become too small for the increased demand of an outlying district. By converting such a main from a low-pressure to a high-pressure supply, the necessity for laying a new main of larger dimensions is avoided. This plan has been followed with success on the Continent in the case of the main from the Mariendorf (Berlin) Gas-Works to Gross Lichterfelde, Steglitz, and Wilmersdorf, which are suburbs lying to the south of Berlin. The main was 40 inches in diameter, diminishing to 24 inches; and in order to avoid the enormous expense of laying a second similar large pipe, it was decided to change from low-pressure to a high-pressure supply so far as this trunk main was concerned, and to control the pressure in the branch supply mains by means of governors. Three Root's blowers were installed at the Mariendorf works, each capable of pumping 13,000 cubic metres (about 457,000 cubic feet) of gas per hour; and at the time of maximum demand, two of the blowers are simultaneously kept in action.

# ROUND THE WORLD—AND SOME GAS-WORKS.

By Maurice Graham.

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## VII.—THROUGH VICTORIA.

The journey from Adelaide was 400 miles through the interior and the real Australian bush. The railway sleeping-cars are comfortable and well designed on the Continental pattern; and a wide lounge serves as a pleasant observation compartment. It was interesting to see the tree-felling and log-rolling and the millions of acres of cleared land now pasturing sheep. While passing through these lonely parts the cry of "Paper, Paper" was frequently heard, coming from men working in the country, whose only news was obtained from the newspapers thrown from the trains. After seeing Serviceton, the border town between South Australia and Victoria, and other places in the district, Ballarat was reached.

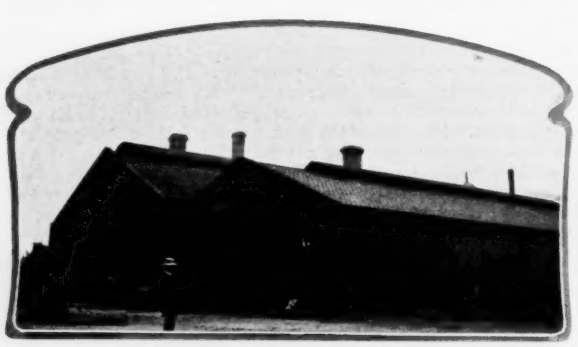
### Ballarat.

This whole town (of some 40,000 people), as with nearly all other gold-mining towns, has been turned over more than once in search of the precious metal; and whenever a house is pulled down that was built before the gold rush, there is no time lost in turning up the ground to a depth of 10 to 14 feet before rebuilding. In fact, the writer further ascertained that some corporations grant permission even to-day for the roadways to be turned over in search of gold, provided that they are properly restored. Ballarat is not only a gold-bearing and mining centre, but is a large railway junction for six lines; and besides this agricultural and pastoral pursuits are increasing rapidly. Its buildings are substantial, and many of its large business premises are worthy of a place in any big city. The streets are beautifully laid out, and are exceedingly wide, with double rows of trees giving a very pleasing effect. Some idea of this can be got from Photograph No. 53, which gives a view of the gas-works from the street.

Photograph No. 53.—General View of the Ballarat Gas-Works.

Photograph No. 54.—Entrance to the Gas-Works.

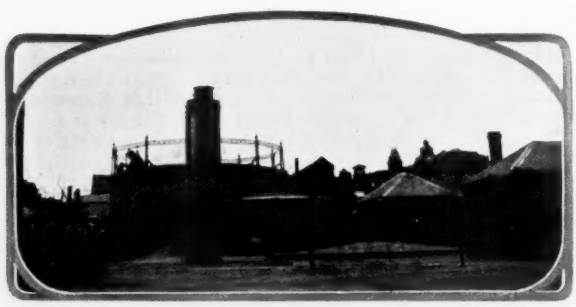
Nobody should go to Ballarat without calling upon the Brothers Figgis, who have the sole management of the Gas Company. The writer had the pleasure of listening to an interesting history of the town during the gold-rush days from Mr. S. E. Figgis, the Engineer, who is this year's President of the Victorian Gas Managers' Association. His gas-works (the entrance to which is seen in Photograph No. 54) were established as far back as the year 1852, and are probably among the earliest, if not the very earliest, gas-works of the Australian Continent. However that may be, the claim is made that the regenerative furnaces in the two retort-houses (Photograph No. 55) were the first built in Australia. They have been in sole use for the past fifteen years. Throughout the works it is all hand labour; bucket, shovel, scoop, and barrow being the surest method in works of this size, making about 60 million cubic feet of gas a year, or about 240,000 cubic feet on the day of greatest production. Altogether there are 18 beds or 140 retorts, all singles, 9 feet by 22 inches by 14 inches.



Photograph No. 55.—The Retort-Houses.

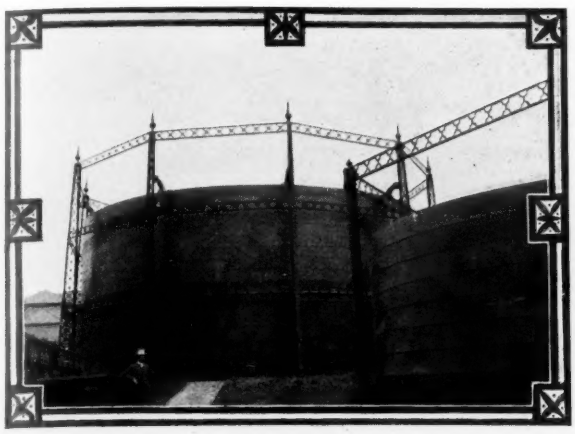
[They contain the first regenerative furnaces built in Australia. The figure in the photograph is Mr. S. E. Figgis, the Engineer.]

The condensers and general view inside the works are reproduced in Photograph No. 56. The exhausters are on Dempster's reciprocating system. Then the writer came across a Livesey washer; and upon reading the name-plate, he found it was one that had been made by him at Elland in 1887, when serving his articles in the workshops of Messrs. R. Dempster and Sons. It was like meeting an old friend. This incident finished, Mr. Figgis said: "There is something interesting to be seen after passing the purifiers"—which were just then being changed (as shown in Photograph No. 57); four boxes each 15 feet square and two 20 feet square. "Well," continued Mr. Figgis, "that large gasholder (the larger one shown in Photograph No. 58) was made by a working blacksmith belonging to this town. We had some difficulty in getting delivery of a holder from England, and being in a hurry I decided if possible to try and get it made in Australia. I thought that if I made the complete detail drawings, and superintended the making and erection, I could safely put the work in the hands of the local farrier and blacksmith, who had a shed next to the gas-works' gate. At first, the smith was unwilling to start; but he soon saw his way through, and the result is that gasholder." The writer inspected the holder, and the general workmanship and the curved cups and dips—all done by hand in a small shed—as well as the plating



Photograph No. 56.—Condensers and View inside the Works.

Photograph No. 57.—Changing the Purifiers.



**Photograph No. 58.—Two of the Gasholders.**

[The larger one was made by a blacksmith, and designed by the Engineer, Mr. Figgis, who appears in the foreground.]

work, certainly do Mr. Figgis and his blacksmith great credit. Mr. Figgis, the designer, is seen in the photograph; but unfortunately the blacksmith was not present. There are four gasholders in all, which contain about 400,000 cubic feet of gas. Reverting to the purifiers, it may be added that only oxide of iron is used in them; and it is revivified *in situ* by a small percentage of air. The oxide is turned over in the boxes every six months, and finally thrown out about every three years. The illuminating power of the gas is 18 candles—shale being used for enriching as required. The public lighting is done by incandescent gas-burners.

When the question was put: "Have you any competition with the electric light, and what is the price of it?" the answer was, "No man living can say, as the electric light has so many prices." Mr. Figgis remarked that the Electric Light Company merely went round and, where possible, undersold the Gas Company. If a customer was paying £250 per annum for gas, the opposition Company tried to induce him to have electricity, and they would only charge £150 or so. The writer heard of one or two such instances.

**Photograph No. 59.—The Bendigo Gas Manager (Mr. W. Pain) and his House on the Works.**

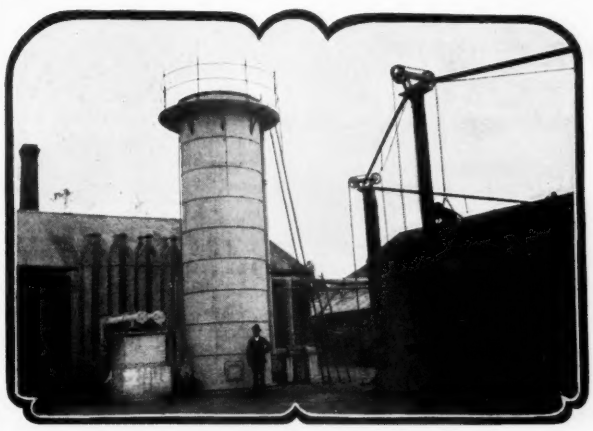
Ballarat is at present rather at a standstill, as mining interests are not very active, and agriculture is just gaining ground. There are, however, good prospects for a continuance of the prosperity of the Gas Company, as there are several hundreds of gas-cookers in use, and an increasing demand for them.

### Gold Mines.

Before leaving Ballarat—and also at some other Victorian towns—the writer had several opportunities of going down gold mines, of which he took advantage—donning the miner's garb and using pick and shovel successfully on the hard quartz rock. Though the gas industry, through its cyanides, is linked with the gold-mining industry, a lengthy description of the writer's interesting inspections and experiences would be out of place. He will, therefore, only say that the first mine visited was 2000 feet deep; while at Bendigo he descended the two deepest gold mines in the world—being 4284 and 4300 feet deep. In that district every nook and corner that one can see is just left in its rough state, after having been turned over, with thousands of small heaps of red gravel, which certainly spoil the country from a sight-seer's point of view. However, there are some pretty views, and the streets do credit to the town of 40,000 people. In the residential portion, there are the pleasant bungalows common to Australia.

### Bendigo Gas-Works.

Calling at the Bendigo Gas-Works, the writer had the pleasure of seeing Mr. W. Pain, the Engineer and Manager, the Secretary being Mr. William Pearsall. The Engineer said he had risen from the ranks and had been in the Bendigo Gas Company for over thirty years. He is justifiably proud, as he now manages a well-built and prosperous concern, which was begun in 1859 and at present serves 2050 consumers. Mr. Pain is seen standing at the gate of his house on the works in Photograph No. 59. A run round the works showed a good bench of four regenerators and five beds direct fired. A comparatively large stock of 2000 tons of coal (Newcastle and Abermain) is kept in stores specially built near the main railway. From there to the retort-house, a quarter-of-a-mile distant, runs a narrow-gauge tramway on which the coal-trucks are drawn by a horse. Coke is in good demand and fetches 30s. per ton. There are two batteries of condensers—one of horizontal, the other of vertical pipes. A Körting steam-jet exhauster is attached to the vertical condensers, while two Beale



**Photograph No. 60.—The Bendigo Gas-Works.**

exhausters, with tar and liquor pumps, are inside the engine-room. The Livesey washer and Walker tower scrubber, besides other plant, are seen in Photograph No. 60. Oxide is used in the four 14 feet square by 4 ft. 6 in. purifiers, which are placed in a good open-sided house, and served by a Weck centre-valve and lifting apparatus. The four gasholders are in good condition and conveniently situated. The works make about 35 million cubic feet a year; the present increase being about 3 per cent.

Mr. Pain called attention to the fact that he had to supply a straggling district of a mining character; some points of supply being six miles from the works. It is also a district where subsidences are continually taking place. There is competition with the electric light; but everything is done to popularize gas. The Company's last report (February, 1908) says: "The popularity of grillers and laundry irons is very marked, and will have a tendency to increase the sale of gas, which at present is well maintained."

### Castlemaine.

The picturesquely situated town of Castlemaine (see Photograph No. 61) was attractive to the writer not only for itself, but on account of family connections and recollections. Soon after the first discovery of gold there in 1851, his grandfather settled there, and became the well-known doctor of the goldfields, and

**Photograph No. 61.—The Picturesque Town of Castlemaine.**

founder of the many institutions of which Castlemaine boasts—hospital, library, mechanics' institute, &c. Within four months of the discovery, 10,000 diggers were on the scene; and, within ten years, gold to the value of over £13,000,000 had been extracted. The "golden fifties" have gone; and so have the tents and huts

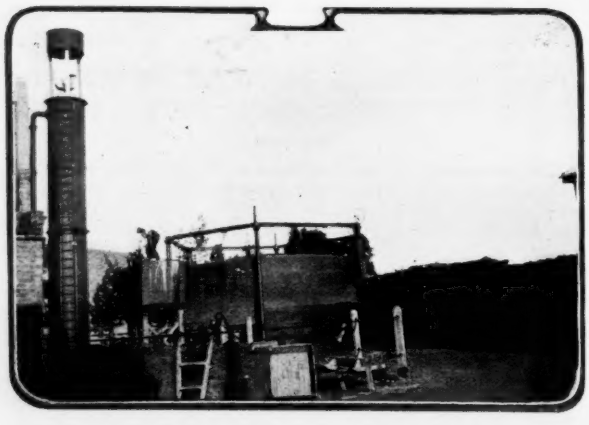
But the green and salubrious town remains, with broad well-kept streets and bright villas. The town is 78 miles from Melbourne, and stands 970 feet above the sea. It is still a large mining centre; and in addition it possesses foundries and woollen mills, besides having fruit-growing and other interests.

The gas-works are small; but the Castlemaine Gas Company has an interesting history. It will this year celebrate its Jubilee; for the first meeting of its shareholders was held on Aug. 17, 1858. Of the original Directors, one is still living—Mr. W. J. Uphill. He resides in London, still retains his original shares, and continues to take an active interest in the Company. In April, 1859, the gas supply was begun; its price being the attractive one of

**Photograph No. 62.—A General View of the Castlemaine Gas-Works.**

£2 per 1000 cubic feet. The Borough Council paid £14 per lamp per annum for street lighting at a six-hour rate, or £24 for a twelve-hour rate. These prices are not so high as would at first sight appear, when it is remembered that all the coal used had to be carted by teams from Melbourne (about 90 miles distant) over roads that were unformed and in winter almost impassable. It often happened that coal ran short, and gas had to be made from gum-leaves and wood; and wood even to-day is used in the retort-house for heating the retorts. But the Company has proved successful, and throughout its career has paid an average dividend of 5 per cent. per annum.

A general view of the little works is given in Photograph No. 62. The plant is clean, compact, and efficient. Photograph No. 63 illustrates some of it—the tower scrubber, and one of the two gasholders. The public lighting is done by incandescent gas-burners, to which automatic lighters have recently been fitted. They have proved so successful that in future no lamplighters will be required. The price of gas is now 10s. 10d. per 1000 cubic feet, but for cooking purposes is reduced to 7s. 6d., and for power to 6s. 8d. There is a 20 per cent. increase of gas consumption,



**Photograph No. 63.—The Tower Scrubber and Gasholder.**

which is no doubt largely accounted for by the growing demand for gas-cookers. That consumers are well looked after by the able and energetic Secretary and Manager of the Company, Mr. H. S. Archdall, may be gathered from a post-card which is sent out with all the monthly accounts. It reads: "Have you a good light? Is your gas-cooker giving you satisfaction? If not, fill in the other side and return this card to us." So that the consumer has the minimum of trouble in communicating with the Gas Company, and feels that he is personally looked after. Such practical and business-like methods are bound to contribute to the Company's success; and the future should be bright and prosperous.

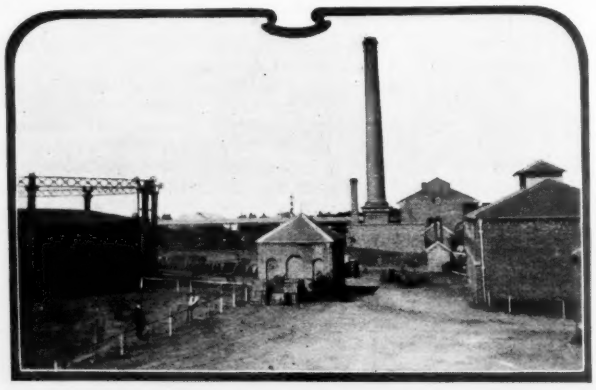
### Geelong.

The writer took advantage of a local steamer passing through Port Phillip to visit the town of Geelong, which is about 45 miles

**Photograph No. 64.—The Geelong Gas-Works, with Mr. Thomas Lord (Manager) and his Son.**

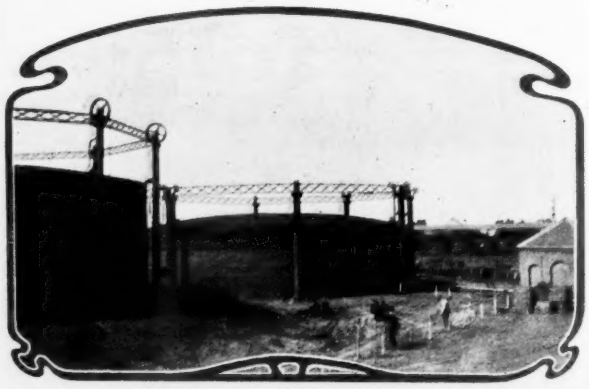
from Melbourne. It is of interest to know that Geelong once had pretensions of becoming the capital of Victoria; but owing to the silting-up of the channel in the bay upon which the town is situated, and the formation of bars, its chance disappeared. It has now, however, another chance, and hopes in the near future to rival Huddersfield and Bradford by the excellence of its woollen goods. Its streets are of great width, and are planted on each side with trees, which give a very pleasant aspect. Ferns, too, are a main feature in the gardens in this district.

Having made an appointment with Mr. Thomas Lord, the Engineer and Manager of the Geelong Gas Company, the writer was driven out to the North Geelong works, two miles from the

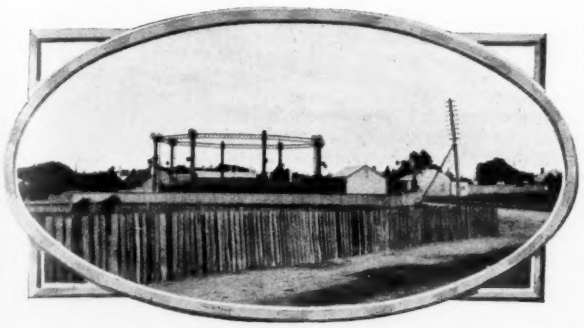


**Photograph No. 65.—The Retort-House and High Chimney.**

town. Mr. Lord was born in Lancashire, and worked at Messrs. Platt's engineering works at Oldham. His thorough mechanical training there well fitted him for his present position. He left the old country 35 years ago, and still looks back upon his pleasant memories of it. He described Liverpool as he knew it to the writer; but it did not quite tally with the Liverpool of to-day. Mr. Thomas Lord and his son are to be seen in Photograph No. 64. The Geelong works were established in 1859—just about the time that so many Australian gas-works were built, showing strong faith in gas and some engineer in those early days. The North Geelong Railway station faces the works; and a railway siding runs parallel with the coal-stores (the capacity of which is 2000 tons) and with the gable wall of the retort-house. The house is a brick building, having adjacent a very tall chimney, seen in Photograph No. 65, both dating back to the original works. The



**Photograph No. 66.—A View of the Gasholders.**



**Photograph No. 67.—The Separate Gasholder Station.**

bench contains eight beds of five oval retorts, 10 feet by 19 inches by 16 inches, heated by direct firing; but shallow regenerators are about to be put in at the end of the bench. The heats were good, and the charges well burnt off. A scoop charger, resting on a movable framework, was used most effectively by the stokers. It was both simple and satisfactory. The wages of stokers runs from 7s. to 8s. per day of eight hours, while ordinary labourers get about 6s. The gas apparatus is of the usual description, and offers nothing of especial note. Vertical pipe condensers, Körting steam-jet exhauster, Livesey washer, tower scrubber, four 14-feet square purifiers using oxide, a small station meter, three gasholders from 62 to 70 feet diameter (see Photograph No. 66), and a governor complete the round of these 40 million cubic feet works.

The most notable thing about them is perhaps the fact that, of their bye-products, tar cannot be supplied in sufficient quantity for the demand. The coke market is also good, fetching 23s. 6d. per ton. The small chemical works on the gas-works' ground belong to Mr. R. J. Fletcher, who is a chemist of local fame.

Leaving the works and nearing the town a separate gasholder station (Photograph No. 67) is passed. Photograph No. 68 shows the gas offices in town. Their interior is well arranged, and a large show-room contains a good assortment of gas fittings and cookers.

**Photograph No. 68.—The Gas Company's Offices.**

There is keen competition with the Electric Light Company, who have also obtained the concession for running the electric trams in the town. But gas at 6s. 8d. per 1000 cubic feet and at 5s. 10d. for power and heating, with varying discounts, can hold its own and increase its consumption by about 10 per cent.

## Cleaning a Reservoir Economically.

In connection with the water-works of M'Keesport, in Pennsylvania, there is a 5 million gallon reservoir on the low-service system which a few months ago was cleaned out by means of sluicing. It is 23 feet deep, 153 ft. 6 in. square at the bottom, and 222 ft. 6 in. square at the top, with side slopes of 1½ to 1. The sides and bottom are paved with concrete. According to some particulars in "Engineering Record," the reservoir had not been cleaned for 15¾ months; and the accumulation of sediment, if evenly distributed over the entire area, would have had an average depth of about 6 feet. The material was all a fine clay, with no evidence of growths of any description; the latter fact being accounted for by the strong acidity of the Youghiogheny River water delivered to it. The reservoir having been emptied, an ordinary fire-hose and nozzle were used; the pressure of water being about 60 lbs. per square inch, derived from the high-pressure service system. No scraping was necessary; and the material was sluiced without difficulty through a 20-inch main into the sewer. The quantity of sludge removed was 3513 cubic yards, or, reckoning it to weigh 102 lbs. per cubic foot, a total of 4838 tons. The cleaning operations occupied not quite two full days; and the total cost was $80, or an average of about 2¼ c. per cubic yard.

## CHEMICAL INVESTIGATIONS AT THE MAGDEBURG GAS-WORKS LABORATORY.

Reference has been made in the "JOURNAL" in previous years to the reports issued by Dr. Otto Pfeiffer on the valuable investigations which are carried out under his control in the laboratory of the Magdeburg Gas-Works. From the report for last year, which has been published in a recent issue of the "Journal für Gasbeleuchtung," a few particulars may be quoted.

A large number of samples of English coals, as supplied to the works, were examined; and it was found that the yield of coke, as determined in the laboratory, agreed pretty closely with that obtained on the works, but that the proportion of volatile matter given by the laboratory test was not a reliable criterion of the yield of gas on the working scale. It was further found that some of the descriptions of coals exhibited violent fluctuations in the proportion of sulphur present in them. The coke made on the works contained on the average 9·6 per cent. of ash, and 1·23 per cent. of volatile sulphur. It had a mean calorific value of 12,963 B.Th.U. per lb. Galician gas oil was solely used in the carburetted water-gas plant at the works. The coal tar produced contained on the average 9·2 per cent. of water and 27·6 per cent. of free carbon. It had a calorific value of 14,787 B.Th.U. gross, and 14,245 B.Th.U. net, per pound. The liquor produced contained on the average 17·5 grammes of real ammonia per litre (1226 grains per gallon). The amount of carbonic acid present in the liquor showed that the bulk of the ammonia was combined in the form of a mono-carbonate. The spent oxide from the purifiers contained on the average 42·1 per cent. of sulphur, 1·8 per cent. of soluble ammonia, 1·86 per cent. of sulphocyanide, and 8·5 per cent. of Prussian blue. A large number of analyses were made of the coal gas, carburetted water gas, and mixed gas on the works. The gross and the net calorific value of the three gases, and the amounts of impurities contained in them, on the average, were as follows:—

| | Coal Gas. | Water Gas. | Mixed Gas. |
|---|---|---|---|
| Calorific power, gross, B.Th.U. per cubic foot | 550 | 487 | 534 |
| ,, ,, net, ,, ,, ,, ,, | 489 | 446 | 478 |
| Total sulphur, grains per 100 cubic feet. | 51·26 | 16·86 | 37·40 |
| Naphthalene vapour, ,, ,, ,, | 8·25 | 0·83 | 6·20 |
| Ammonia ,, ,, ,, | 0·48 | 0·087 | 0·174 |

Dr. Pfeiffer directs attention to the low proportion of naphthalene in the water gas (which, of course, had not been specially treated for its removal), as compared with the quantity in the coal gas, which had been washed with oil. The amount of sulphur in the water gas also was only about one-third of that found in the coal gas.

The mantle factory attached to the works produced during the year 54,210 mantles for street lighting. The cost of manufacture was approximately 1d., or, after deduction of the value of the recovered material, only 0·82d. per mantle.

The foregoing are the particulars of more general interest in the exceptionally complete annual report issued by the authorities of the Magdeburg Gas-Works on the unusually exhaustive and numerous investigations consistently carried out there.

## RELATIVE MERITS OF COMPRESSED AIR AND COMPRESSED GAS FOR HIGH-POWER LIGHTING.

Herr O. Klatte, of Hamburg, presented a short paper on this subject at the last meeting of the Austro-Hungarian Association of Gas and Water Engineers. The paper has been published in the last number of the "Zeitschrift des Vereines der Gas- und Wasserfachmänner in Oesterreich-Ungarn."

The author refers first to the fact that in his work with the Pharos Light Company, at Hamburg, he has had experience of both systems of high-power lighting, and has come to the conclusion that, speaking generally, compressed air is more advantageous than compressed gas. His reasons for arriving at this conclusion are briefly as follows: When it is necessary to combine a supply of high-pressure lighting to business houses and other private consumers with that of street lighting, high-pressure gas is undesirable, because special meters are required for it, and the high-pressure service must be carried into the basement of the house to the meter and out again for the outside lighting of shop windows. There is greater danger of leakage from the high-pressure gas service, and lighting and extinguishing of separate burners is attended with some difficulty. On the other hand, the compressed air system of high power lighting requires only the ordinary domestic gas-meter. The gas is supplied at the same price for the high-power as for the ordinary burners; while the latter can, if required, be installed from the same service alongside the high-power lamps. There is, moreover, no greater danger from leakage. Even, however, when there is no question of supplying private consumers as well as street-lamps, Herr Klatte still thinks that high-pressure gas-mains are undesirable in streets where there are any trees, as the latter would be injured by escapes of gas from the mains. Where there are no trees, and a completely new system of high-power lighting is

being installed, or where there are any existing gas-compressing stations, he considers it preferable to employ high-pressure gas. He refers to the fact that in Berlin there were existing compressing stations for gas, and the high-pressure distributing mains run chiefly through streets in which there are no trees. For lighting on gas-works, where the air in the buildings is apt to be loaded with dust, he considers that the compressed air system is far superior, because the air supplied to the burners in that case is taken from outside the buildings. He also refers to the installations of Pharos compressed-air high-power lights which are used for street lighting in Bremen and Utrecht, and claims that, generally speaking, the compressed air system is cheaper than high-pressure gas.

## IMPROVEMENTS IN HYDRAULIC MAINS.

By William Blakeley, of Thornhill, Dewsbury.

The great interest which is at present being taken in the improvement of the hydraulic main—as shown by recent papers and letters upon the subject—has brought to my mind an idea which I think would, in a practical manner, overcome all the difficulties mentioned. There have been many inventions of the anti-dip type, but all of them seem to have some disadvantage attached to them. For instance, where valves are used, these are liable to block with tar, or leak; and there is also the danger of the attendant forgetting to open them at the proper time.

The enclosed drawing will I think be perfectly clear, and the publication of same would no doubt interest your readers. A is the usual ascension pipe leading into the inverted dip-pipe B; and C is another pipe leading the gas to the foul main. D is an inverted vessel (of suitable form) which covers both pipes, and is also provided with a short midfeather, which when the vessel is at its lowest point dips about 1 inch or more below the surface of the water or liquor contained in the hydraulic main E.

In the position shown, the connection between the pipes B and C is sealed; and the retorts may be safely charged. When this is done and the mouthpiece is fastened, the chain L is pulled. This raises the vessel, and causes the midfeather to be lifted out of the liquor. The gas made then passes into the pipe C, and so on to foul main without interruption.

A ring on the end of the chain can be fastened in any suitable manner, so that the midfeather is out of the liquor during the whole time of gas-making, and preferably it could be fastened to the lever of the mouthpiece—the length being arranged accordingly to suit each tier of retorts. This would always be a reminder to the stoker, as he could not avoid noticing the chain each time he opened the mouthpiece.

The inverted vessel could either be made of sheet iron or cast iron, and would of course require to be gas-tight. If of cast iron, it might be necessary to put a counterbalance weight on the chain, so as to relieve the weight.

The top of the pipe B could be chamfered off on the outside, so that any tendency of the tar to rest there would be overcome; and the tar would fall into the hydraulic main and not down the ascension pipe. The hydraulic main would, of course, be provided with the usual liquor seal-valve, and pipes to take away

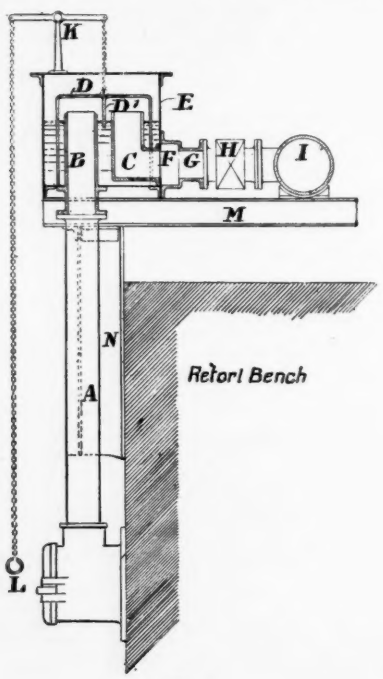



Fig. 1.

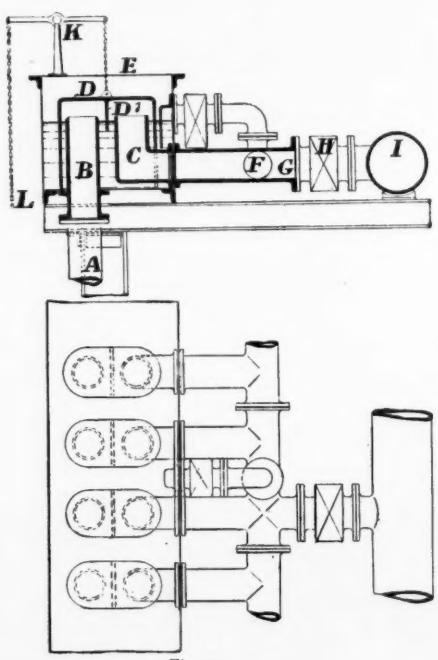



Fig. 2.

the tar as formed, a suitable arrangement of which is shown on drawing.

The arrangement in fig. 1 shows the outlet pipes C connected to a channel casting F, running the full length of the main, with a branch G forming a connection to the foul main I. A valve H would also be provided, for cutting off each of the separate mains as required. The channel casting F would also form the drain-pipe for the tar deposited in the pipes C and G; and a suitable connection would be made from it to the tar-main.

The construction in fig. 2 shows a similar arrangement, but with a separate tar-main F, connected by branches to each outlet pipe, and also by one branch G to the foul main I, with intermediate valve for shutting off the hydraulic main when required. This view also shows the seal-valve for regulating the level in the hydraulic main; and the tar as it overflows through the valve is carried to the tar-main F as shown.

The greatest advantage which the above idea carries out, is that by its means a perfect connection is made between the retorts and the foul main, with no pressure to overcome as in the case of the ordinary dips; and the same perfection of seal is obtained during the charging, as is the case with the usual dips, together with the safety of the seal in case the attendant does not pull up the vessel after charging. If he does not do this, the apparatus works like an ordinary dip-pipe—the gas escaping by getting underneath the midfeather. This apparatus, of course, also enables a retort-house governor to be worked in the most efficient manner, as it is bound to do when there is no seal to overcome.

The expense of this class of main should not be any more than the ordinary type, as the extra work in the main, &c., will all be saved in the fact that no arch-pipes will be required, and the ascension pipes will be less in height. Also the retort mouthpieces need not be provided with the usual supports, as practically the whole weight would be carried by the buckstays.

The hydraulic main could, of course, have an open top; but preferably it should have a cover to keep the dust, &c., out.

No doubt, after practical experience, other improvements would be found; and I trust the above description will interest your readers.

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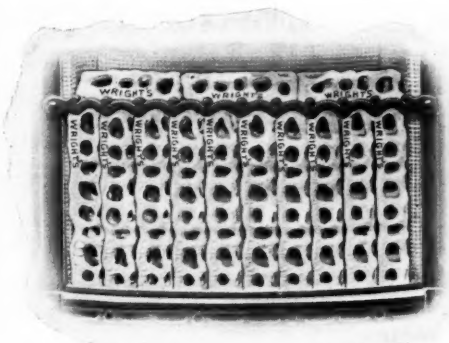
At the Parish Church, Bispham, near Blackpool, on the 14th inst., the marriage was solemnized of Mr. Walter Whatmough, the Gas Engineer and Manager to the Heywood Corporation, and Miss Minnie Young Brameld, daughter of Mr. J. R. Brameld, of Sheffield.

In the course of an article dealing with the possibilities of peat as a substitute for coal which recently appeared in the "Daily Telegraph," reference was made to Dr. Martin Ekenberg's process for the conversion of peat into fuel, the principal feature of which is that carbonization is carried out by superheated water, after which the water can be easily removed by simple pressure; the final product being a dense, hard, coal-like fuel, having considerable heating value. Some small peat briquettes tested by Professor Lewes gave results which mean, roughly, that 3 lbs. of the briquettes obtained at the lowest possible temperature (155° C.) will furnish as much heat as 2 lbs. of good English coal. At the carbonizing temperatures used in the industrial production—viz., 200° C.—briquettes are obtained of such heating value that 6 lbs. of them are equal to 5 lbs. of coal.

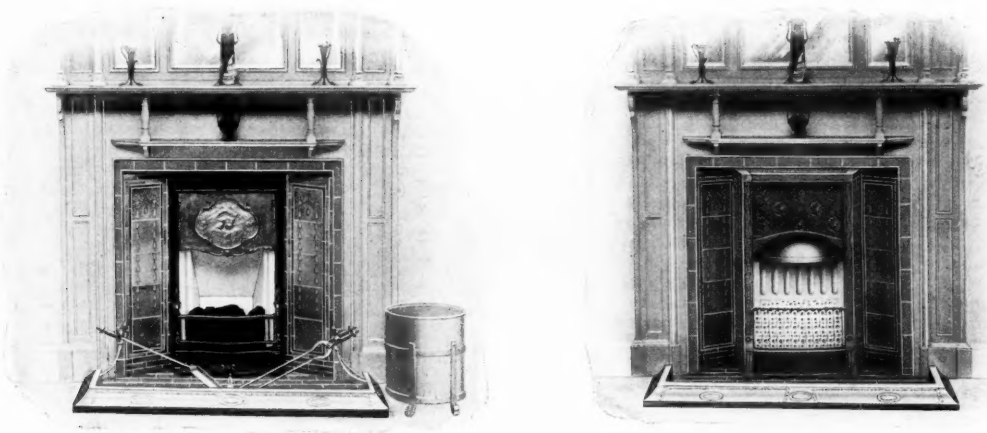
# THE FORTHCOMING GAS-STOVE SEASON.

### John Wright and Co's New Types of Heaters.

THOUGH England is yet basking in summer heat, we are reminded that the autumn is rapidly approaching. Among the earliest intimations of preparation for the forthcoming winter stove-season is that received from Messrs. John Wright and Co., Limited, of Birmingham, who claim that their new forms of stoves—the "N.V.," the "Stadium," the "Druid," the "Wizard," and the "Mascot"—embody features which mark distinct improvement on anything they have so far introduced to the public. All these forms of stoves are fitted with the firm's patent "Thermo" fire-front—an arrangement to obviate the necessity of using any metal-guard in front of the fuel and so prevent the full radiating effect of the stoves being realized. The proper quantity of fuel is always sent out with these stoves, with full directions as to the way in which it has to be placed in position.



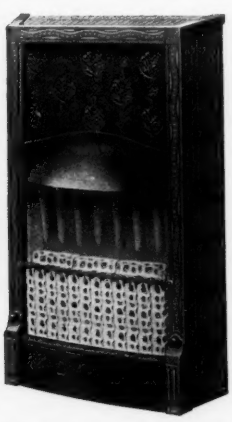

Section of 14-inch "Mascot" Fire, showing Patent "Thermo" Firefront.



Showing the Conversion of a Coal Stove to the "N.V." Method of Gas Heating.

The "N.V." gas-fire is made in two forms, as shown in the illustrations—one adapted for building-in to any grate as a stove interior, the other with three extensions or wings, so as to cover the fire-opening of any existing grate. In this way, the stove appears as part of the grate itself, while at the same time sufficient draught is ensured to lead to perfect combustion of the gas.

The "N.V." adapted for Building-in as a Stove Interior.



The Patent "N.V." Gas-Fire, showing Extensions.

The "Stadium" stove is already made in two sizes, with 10-inch and 14-inch width of fire. It is a high-grade fire, and is fitted with removable brick and burner, with gas and air adjuster. The "Druid," described as a nursery fire, is also very effective, though simple in design. It is made only in one size, with 10-inch width of fire.

The "Wizard" is made in three sizes, with 8½-inch, 10-inch, and 14-inch width of fire, and is particularly adapted as a slot gas-fire. Its price is so moderate that it should find extensive use for bedroom heating. The casting is of artistic, though unobtrusive, design. The "Mascot" is a similar stove, but with square top. It is supplied in three sizes, and has the same widths of fire as the "Wizard." The "Thermo" fire-front is fitted to the larger sizes of both these stoves; while the smaller sizes will later on be similarly arranged.

The "Stadium" Gas-Fire.

The "Druid" Gas-Fire.

The "Wizard" Gas-Fire.

The "Mascot" Gas-Fire.

These few particulars and an examination of the illustrations will, we feel sure, convince readers that Messrs. John Wright and Co. are determined not to lag behind in their endeavours to further popularize gas-heating, and that in regard to the work here referred to they have made some very distinct advance over former years' productions.

# FELD'S GAS PURIFICATION PROCESS.

### Two Further Patent Specifications.

Last week the English Patent Office issued the specifications of two more patents in the series standing in the name of Herr Walther Feld—No. 27,568 of Dec. 13, 1907, and No. 28,390 of Dec. 24, 1907. Under International Convention the dates claimed for these patents are June 1 and 14, 1907, respectively.

In the former of these specifications, the patentee refers to another patent (No. 27,567) which has already been dealt with in the "JOURNAL—see May 5, 1908, p. 297—and says that it has been found that, by using gases already cooled and purified for admixture with the gases to be treated, the low temperature of the gases used for such admixture frequently causes such a lowering of the temperature of the gaseous mixture that it falls below the temperature of the dew-point. This inconvenience is not very perceptible when working at low temperatures of the gas, as with most liquids the differences in the dew-point depend but little upon temperature. If the gas has been cooled down to 36° C., and if the ammonia is to be washed out at about 32° C., an addition (per cubic metre) of about 1 cubic metre of gas with a dew-point and temperature of 24° C. will be sufficient to avoid the separation of water and tar products in the ammonia washing.

For instance (taking the saturation tension for air with regard to water), 1 cubic metre of air at 24° C. contains, in the saturated state, 21½ grammes of water, and 1 cubic metre of air at 36° C. contains 41 grammes of water. If to the latter be added a cubic metre of air with a dew-point and temperature of 24° C., a gaseous mixture will result which (without taking into consideration the change of volume on mixing) contains 31·2 grammes of water and has a temperature of about 32° C. As, however, air at 32° C., in the saturated state, contains 33½ grammes of water, the dew-point of the gaseous mixture is somewhat below its own temperature. More unfavourable is the case in which the process according to the No. 27,567 patent is applied to hot gases, as the tension of saturation at high temperatures increases much more rapidly with the temperature than it does at a lower temperature.

If, for instance, to a cubic metre of air at 85° C., having a dew-point of 80° C., a cubic metre of air at 15° C., having a dew-point of 15° C., be added, a gaseous mixture is obtained having a temperature of about 50° C. A cubic metre of air which at 80° C. is saturated with water contains about 290 grammes of water; a cubic metre of air which is saturated at 15° C. contains about 13 grammes of water. If the change of volume caused by lowering the temperature be now disregarded, the gaseous mixture would contain about 150 grammes of water per cubic metre. 1 cubic metre of air which at 50° C. is saturated with water contains, however, only about 82 grammes of water. There will accordingly be a corresponding separation of water when the gases are mixed together.

Coal gases behave similarly to air as regards the dew-point of water, tar products, and the like; the proportions being, however, different according to the different constituents of the gases or the different kinds of gases.

In order to avoid these disadvantages, the mixing of the gases must (as mentioned in No. 27,567 application) be so effected that the temperature of the mixture remains above the dew-point of the mixture. This can be done in various ways. For instance, the mixture of both gases may be arranged before the gas to be purified is cooled down to nearly its dew-point. It is, however, possible to heat both gases together; but preferably the gas to be admixed is heated alone before mixing. The heating may be done in any suitable way, as it is of no importance (as regards the effect) how it is done. If, for instance, air at 120° C. whose dew-point lies at about 80° C. be mixed in such amounts as will make 1 cubic metre at 80° C. with ½ metre having a temperature and dew-point of 20° C., 1½ cubic metres of gas mixture are obtained (disregarding decrease of volume) with a temperature of about 85° C. and a water-content of 290 + 17 = 307 grammes. In other words, 1 cubic metre of the gaseous mixture contains only about 200 grammes of water. The dew-point of the mixture is at about 70° C., at which 1 cubic metre of saturated air contains about 200 grammes of water. If this method be followed—for instance, in lowering the dew-point of the gases as regards water, and the so-called light oils, and the like—it will be advisable to supply the admixture gases to the gases to be purified at a temperature as high as possible. This would be before the first separation of tar. By this means, rapid and easily-controlled cooling of the gases is obtained, at the same time with the required lowering of the dew-point of the gas as regards water, light oils, and the like.

If the gases to be purified be already cooled down to near their dew-point, they may be heated before they are mixed, or the already purified admixture of gases can be heated before the mixture is effected. The more highly the admixture gas is heated, the less is the amount required to be added, and also the less the amount of heat to be supplied. The pre-heating can be effected in any suitable manner; the most economical way being to supply the gas to be purified to the admixture gas in a pre-heater—the flow of the gases being in opposite directions. The temperature at which the gas mixture is to be afterwards treated is the criterion for the temperature of preheating.

The process, like the process of the earlier patent, is said to be applicable not only in washing out ammonia, but also in extracting any other constituent from the gas which it is desired to protect against dilution by water, or against being contaminated by such gas constituents as could separate in accordance with their tension of vaporization.

In the patent (No. 28,390) applied for eleven days after that referred to above, the inventor states that further investigations which he had made had shown that the lowering of the dew-point can be also effected by supplying to the gases vapours such as were not originally contained in the gases, or with which the gases were not saturated. For this purpose, vapours may be used which are capable of increasing the volume of the gases and which lower the dew-point of gases with regard to the constituent the separation of which is to be prevented.

If, for instance, the separation of water from coal gas is to be prevented, the gas can be mixed with vapours from tarry products of coal, or brown coal—for instance, benzene or the like—or the vapours from mineral oils may be added to the gas. If the separation of tar products is to be prevented, aqueous vapour may be added to the gas. The selection of vapours will be in accordance with the requirements and with practicability and economy. For example, presuming that from coal gas at a temperature of 80° C., those tar products are to be washed out which, in accordance with their vapour tension, separate at above 80° C. The gas is saturated with these tar products and a further quantity of them will separate from the gas as soon as the temperature falls below 80° C.

Suppose, for instance, that the ammonia is to be washed out from the gas, at about 80° C., by means of sulphuric acid. There is then danger that the sulphuric acid, and likewise the ammonium sulphate produced, will be contaminated by tar products as soon as the temperature of the gas is a little lowered in the washing process. In order to avoid this, steam is added to the gas in such amount that the increase of volume is sufficient to prevent the separation of tar products—that is, sufficient to lower the dew-point of the gas as regards tar products. If, however, a small increase of temperature of the gas takes place, this assists the process without the least disadvantage. The higher the temperature of the steam, the less of it is needed. It is also possible to blow superheated steam into the gas. Benzene vapours, or vapours of other light oils, can be used instead of steam, as at 80° C. the coal gas is much above the dew-point as regards these vapours.

The process is the same as that already described, when it is desired, for instance, to wash out hydrocyanic acid by one of the known processes at about from 70° to 90° C., and at the same time prevent the product obtained becoming contaminated with tar products. The separation of gas constituents at a low temperature—for instance, the separation of ammonia by gypsum, or of hydrocyanic acid by alkalies, or earth alkalies and iron compounds, at temperatures between 50° and 30° C. and less—is dealt with in the same manner; care being exercised to take into account the conditions which are changed by the lower temperature.

The process, like those of the earlier applications, can likewise be applied if desired to the separation of tar products of higher boiling points from the gas without their being mixed with products of lower boiling points, and *vice versâ*. Let it be presumed that from gas having a temperature of 100° C. and saturated with tar products having a boiling point of 180° C. and upwards, tar products having a boiling point of 250° C. and upwards are to be separated at about 90° C. without the products being mixed with products of lower boiling point, the proceeding can be as follows: To the gas, steam or benzene or other vapour is added; the steam or vapour being saturated with tar products having a boiling point of over 250° C., and the mixture is then cooled down to 90° C. Only the products having a boiling point of 250° C. and upwards will then separate; those of lower boiling point not separating if the gas be cooled considerably below 90° C.—the dew-point for these products being lower and lower the more steam or vapour is supplied to the gas. The last process, of saturating the steam or vapour with products such as are to be separated can also be applied to the gases admixed in accordance with the earlier patents.

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**The Joint Meeting of Junior Gas Associations in London.**—We learn from Mr. W. J. Liberty, the President of the London and Southern District Junior Gas Association, who is Hon. Secretary of the Reception Committee formed in connection with the visit of the Provincial Junior Gas Associations to the Metropolis on Saturday, that the programme of arrangements is now complete. The party will start at 8 a.m. on a drive through London, which will occupy their time till 12.45 p.m., when they are due at the Wood Lane entrance of the Franco-British Exhibition. In the course of the drive, visits will be paid to the show-rooms of the Davis Gas-Stove Company in Queen Victoria Street, Messrs. George Glover and Co.'s meter-works at Chelsea, the show-rooms of the Gaslight and Coke Company at Kensington, and Mr. William Edgar's lamp-works at Hammersmith. On arriving at the Exhibition, luncheon will be served in the Tourists' Room in the Machinery Hall. At two o'clock, the united meeting will be held in the Congress Hall, under the presidency of Mr. H. E. Jones, who will be supported by the Presidents of the London, Midland, Manchester, and Yorkshire Associations. There will be a joint meeting of the Councils of the Associations early in the afternoon; and the rest of the day will be available for visiting the Gas Section and other portions of the Exhibition.

# THE DISTRIBUTION DEPARTMENT.

By J. Brodie, of Lisburn.

[A Paper read before the Irish Association of Gas Managers, Aug. 11.]

Owing to the increasing demand for higher pressures in the street mains, it behoves us, in future, to consider well the relative merits of cast-iron and steel mains. There can be no doubt whatever that cast-iron mains, with their joints every 6, 9, or 12 feet, are a fruitful source of "unaccounted-for" gas; and in the face of an ever-increasing and heavy motor-traffic on our macadamized roads, we are brought to consider seriously the advisability, when relaying mains, of substituting steel tubes or pipes for cast-iron, owing to their many advantages over the latter. Objections have been raised to the use of these tubes by reason of their liability to corrode in the event of the covering becoming damaged. With a little care, however, on the part of the main-layer, and a supply of patching material, little trouble need be apprehended on this score. Another objection, and perhaps a more serious one, has been the very thin metal of which these tubes are composed, and the consequent inability to obtain a continuous thread when tapping for a service-pipe, especially in the smaller sizes. This objection, I am glad to say, has now been removed by the Mannesmann Tube Company, who have, after considerable experiments, produced a tube with a thickened ridge on opposite sides of the interior. A line is run along the outside of the tube to show the position for drilling. When laying this pipe in a shallow trench, it can be jointed so that the ridges are lying horizontally, and the services can be taken from the sides; and in a deep trench the tubes can be laid the opposite way, and the services taken from the top. Personally, I am of opinion that these tubes, made with the Parkinson patent joint, and stayed with lead wool, will prove to be one of the greatest aids in the diminution of leakage. I have here for inspection a section of the Mannesmann Tube Company's patent ridged tube, and also of the Parkinson joint.

I need hardly draw attention to the matter of service-pipes, unless it be to remind my hearers, when laying a service, to err on the safe side as regards the diameter of the pipe, and run it full-bore until it reaches above the floor-level in the interior of the building. It can then be reduced to whatever size may be deemed necessary for immediate requirements; while ample supply is on hand for future extensions. In the internal fitting of houses, it is much to be regretted that the advice of the gas department is not taken advantage of to the extent it might be. Architects very often pay too little attention to this comparatively small but important matter of house fitting; and in their specifications a small sum, often inadequate, is set aside for this purpose. No detail is given as to the size and weight of pipe to be used; while the position of the brackets in the rooms is left to the discretion of the contractor, and very often they are placed, not with a view to illumination, but where they will require a minimum of pipe.

Happening to be lately in a house just out of the contractors' hands, I found that inverted brackets had been fixed over the fireplace at a height of 5 ft. 9 in. from the floor, with the result that the light came very much below the level of the eyes, in addition to scorching a rather fine mantelboard. It is in matters such as these that a "word in season" would be of value, were it only asked for. On the other hand, managers are constantly being asked by consumers for advice as to the purchase of incandescent burners for the various departments of lighting; and here lies the manager's opportunity.

Since the incandescent burner was first introduced, many and varied have been the attempts to depart from the simple and upright type, and success has at length been reached in the production of the present-day inverted burners. The light from these, under present conditions, is somewhat in excess of that obtained from upright burners, while the apparent effect is very much greater—the rays being thrown in a downward direction. Hence the popularity of the burner. He would be a rash man, however, who would say that we have reached finality either in inverted or upright burners. So much depends on the shape of the mantle or other body from which the light is emitted, as witness the report on the "Hella Bushlight" in the "Journal of Gas Lighting" for Aug. 4. In this burner, instead of the flame being retained under a mantle, it is broken up by impinging on a series of points or branches; and the results obtained are claimed to be considerably in excess of those from a mantle burner. Can we say that we are even yet within sight of the efficiency-limit of coal gas? One great improvement, which has been adopted on the better class burners lately, is the needle regulator. By the use of this ingenious arrangement, blackened mantles and bad light are now things of the past; the consumer being able to obtain for himself, or herself, the maximum amount of light for the minimum of gas consumed.

In consequence of the large number of incandescent burners and lamps now on the market (I am speaking of the inverted type), it is often somewhat difficult to decide which to adopt for a particular purpose. It was, therefore, with much pleasure that I noted the exhaustive reports of tests made by Mr. W. R. Herring, M.Inst.C.E., of certain well-known lamps. Authoritative tests, such as these, cannot fail to be of great benefit to us all; and I believe it would be of still greater benefit were the Council of the Institution of Gas Engineers to take the matter up and make independent tests of all types of lamps on the same basis. Lamps passing a certain standard would thus bear the hall-mark of efficiency; and managers who have no means of making such tests would know exactly what they were purchasing. However, taking Mr. Herring's tests, the results which were obtained from low-pressure inverted lamps are truly wonderful. When we can get lamps consuming 3½ to 4 feet per hour at 2-inch pressure and giving a light of 30 to 40 candles per cubic foot, we can feel that our backs are not yet against the wall, and that there is still long life and prosperity for the gas industry. It is apparent that makers of inverted burners have appreciated the desirability of having a standard fitting for glass; and possibly the same may yet be said for mantles; as I can see no reason why a standard fitting for these should not be adopted, and so obviate the necessity of carrying so many different stocks of mantles.

Owing to the very keen competition of the present day between gas and electricity, it is of the utmost importance to thoroughly understand the wants of the consumer and to study each particular case on its merits. Those of us who are not brought into direct competition with electric light are in the seemingly happy position of having things all their own way—a position which occasionally lulls into a false sense of security, and we awake to find our territory invaded by our rival, the electrical engineer, who comes with wonderful tales of electricity at half the price of gas, no matter what that may be, of handiness, of freedom from fire risk, of cleanliness, and, not least, of better and healthier air in our rooms and offices. It is statements such as these that we are called upon to combat, and we can only do so by keeping thoroughly abreast of the times and by being able to prove, in our own show-rooms, by actual demonstration, the superiority of our product.

I have before me the statement of an electrical engineer that electricity at 6d. per unit consumed in a metallic filament lamp compares favourably with gas at 3s. per 1000 cubic feet. A 32-candle power osram lamp consumes 1·5 watts per candle-power-hour, or a total for six hours of 288 watts, which, at 6d. per unit, costs 1¼d. Against this we have a gas-lamp consuming 3½ cubic feet per hour and giving a light of 33 candles per cubic foot. [I am here quoting from Mr. Herring's tests.] Burning for six hours, this lamp would consume 21 feet, which, at 3s. per 1000 feet, would amount to ¾d.—a slight difference in cost of 100 per cent. and in illuminating power of 350 per cent. in favour of gas. So much for a comparison for house-lighting purposes. Let us look for a moment at street lighting costs. According to the same electrical engineer, an arc lamp consumes ¾ watt per candle power per hour. Taking a lighting rate of 1½d. per unit, the so-called 1000-candle power arc lamp would consume 750 watts per hour and give an efficiency of 700-candle power at a cost of (say) 1·13d., or 6·78d. for six hours. The new Keith inverted lamp gives a light of 68 candles per cubic foot, and consumes 24 feet per hour, or a total efficiency of 1564 candle power. At a lighting rate of 3s. per 1000 cubic feet, the cost would be 0·9d. per hour, or for six hours 5·4d.—again a saving in favour of gas of (say) 20 per cent., and an actual illuminating power of 100 per cent. more than its rival. Surely it is our duty to show up in their true light comparisons made by electrical touts for the purpose of catching the attention of the unwary and to resist to the utmost all endeavours of interested parties to obtain the endorsement of a blank cheque on the rates—rates towards which gas companies are very large contributors.

As regards the so-called superiority of electricity from the hygienic standpoint, that this idea has been thoroughly quashed is clearly shown by Dr. Rideal in his paper, read before the Royal Sanitary Institute, on "The Relative Hygienic Values of Gas and Electricity," in which are embodied the results of a special inquiry. An abstract was given in our technical journals of March last, and is well worth perusal. From the medical, chemical, and physical data obtained by this inquiry, it is clearly shown that the choice between the two systems of lighting does not depend on hygienic considerations. Time will not permit me to deal with the other points above-mentioned; but I trust they will be taken up in the discussion.

Owing to present-day requirements, it is absolutely essential for the gas manager to have a thorough grasp of commercial detail, of the rise and fall of the markets, and a knowledge of where and when to buy the various articles best adapted to his needs at the lowest price consistent with quality. Manufacturers are always willing to deal with gas departments; and it is a most valuable experience for a manager to stand absolutely on his own feet, to do his own purchasing, and gradually, by experience, to find out where he can get the best value for his money. How else can the experience necessary to carry on any department of our work be gained? With regard to gas-fittings, I am sure we must all agree that the manufacturers of these deserve the highest praise and credit for the beautiful and chaste designs which they have put on the market, and which enable us so well to meet competition.

*Discussion.*

The President remarked that the paper touched so many points, and they being managers of small works, the fittings department came closely home to them. Some of them could do the work themselves; others had to get assistance. With regard to Mannesmann mains, he had not had occasion to try them; he still had faith in cast-iron pipes. In certain districts—such as in a colliery district, or in new ground—he would not put in a cast-iron main. Steel would be much better there, because it

was not liable to leakage. But in a city road, where there was not very much traffic, he believed in cast-iron mains. He would be afraid that the covering which was put over the Mannesmann main would, with some descriptions of soil, tend to corrode it. Steel pipe, as they all knew, was much sooner oxidized than cast-iron pipe. He had taken up old cast-iron pipes which had been down fifty or sixty years, and they were as good as when they were laid. They were encrusted with the soil, but were perfectly tight. He had great faith in cast-iron pipes for mains, where they could be kept from heavy traffic. With regard to burners, upright and inverted, the writer qualified himself a little, he thought, when he said there was not much difference between the two. They had a longer mantle in the upright than they had in the inverted. This was in low-pressure lighting. Of course, in high-pressure lighting the inverted was the greater favourite with consumers at large than the upright burner. He had very few applications for upright burners. The inverted burner was very convenient, in having no shadow. Mr. Brodie made a good case for gas as against electricity. As he mentioned, some of them might not be affected at the present time, but they did not know how soon they might be, because the electrical people were getting so numerous on the road. They came and endeavoured to get round the men in urban district councils. They were very fluent in speech, and expressed themselves better than gas men could; and thus they made headway. And if they got into touch with a person whose ear was open to their story, it did not matter if a mistake were made in introducing electric light, because the loss came out of the pockets of the ratepayers. Therefore electricians frequently made headway for a time, until some gas man came in and burst the bubble. The fitting of houses was a thing they had no control over in small towns and villages. In larger towns there were rules laid down by the town councils that certain sizes of pipes must be put into houses; but in small places, the rule with most plumbers, contractors, and architects was that the cheaper they could do the job the better.

Mr. J. G. Tooms (Waterford) was rather disappointed that there was no mention whatever in the paper of the maintenance of incandescent burners or fittings generally. There was a great deal regarding the photometrical tests of different burners, very good information indeed as to special types of burners; but he thought that they, as technical men, dealing with lighting in their different districts, knew perfectly well that, under ordinary circumstances, half the rated power was not obtained by the consumer. He thought that the lighting authority should be the gas authority, and that it was essential that all forms of gas-using appliances should be maintained by them. He agreed with the President in his partiality for cast-iron mains. Most of the leakage they had was due to the services. In country towns they were not bothered to a great extent with motor or other traffic interfering with the efficiency of the joints in the old form of cast-iron pipes—in fact, it had been his practice for some years to put in turned and bored cast-iron mains, without any filling up of the sockets. He found this to be perfectly satisfactory. Except under special circumstances, he would not think of adopting Mannesmann tubes. It was claimed that these tubes could be easily bent; but in his experience it was extremely difficult to bend 6-inch tubes. He found it impossible to bend them without heating, which destroyed the covering; and, in his opinion, it was not possible to replace the covering in such an efficient manner as it was done at the works. Despite all the rules and regulations which it was possible for local authorities to frame, plumbers would never be got to do fitting work as gas managers did it. They ought to carry out such work themselves. If they did so, they would be responsible for the light being efficient. There was no reason why, even in the smallest works, they should not do this. No doubt, the tests of burners made by special authorities were very valuable; but, to his mind, a test made under usual working conditions was far more valuable to the ordinary gas manager. A laboratory test of burners and mantles was of little value for practical purposes. He was aware that it was distinctly *infra dig.* to say this, when they should all be scientific, and work by scientific methods; but it had been his practice to do as he suggested, and he had found it to work out extremely satisfactorily. Mr. Brodie's comparisons with electric lighting were particularly interesting. He was in the happy position of not having had any competition with electric lighting, although there were several isolated installations throughout the town. But he thought that Mr. Brodie rather made a mistake in his figures for electricity when he gave 1·5 watts as the consumption per hour of an Osram lamp. The President and also Mr. Tyndall, gave the consumption as 1·3 watts. Either the figure given by Mr. Brodie was wrong, or those given by the President and Mr. Tyndall were wrong.

Mr. G. Airth (Dundalk) suggested that the remark "let us be up and doing" should be changed to "let us be up and hustling;" for it was hustling which was going to pay them in gas-works now. If they did not hustle, they would be hustled out. He had laid somewhere about a mile of Mannesmann tubing this year, and he certainly had great difficulty in bending the 6 inch main; but he got it done. He had to find out whether they had damaged the surface of the tubes; and in some places he had taken off the covering, leaving the tubes exposed, so that he might be able to see how much they would deteriorate. He did not believe these tubes should be laid in a shallow trench; but it was the surface which determined the depth at which a main should be laid, consistent with the traffic which was to go over it. He had some 60 or 70 tons of bricks going over the streets, in waggons drawn by traction-engines; and it would not do to lay mains within 12 inches of the surface. With regard to internal fittings, when he was in the employment of the Paisley Corporation, they were able to dictate their terms to the plumbers. He found now, however, that there was great difficulty in a gas company dictating anything. What he did was, whenever he knew that the plans for a house were passed, to go to the man who was going to build it, and ask who was going to be the plumber, and offer to test the fittings. The previous week he tested fittings in a new house, and found out leakages to such an extent that, even though the occupier had not burned a single jet of gas, but had had the gas turned on, his gas bill would have been £48 in the year. He did not advocate gas companies going in for selling incandescent burners or other accessories, unless in special circumstances. Mr. Brodie mentioned about a standard mantle. He thought that should be emphasized. If they could make it imperative, people would very soon come to see the advantage. There were only two consumers of electricity in Dundalk at the present time; and they were the strongest opponents of the town taking up electricity—he thought a very good argument in favour of gas.

The Hon. Secretary told an experience he had the previous week, when it was reported to him that a gas-main had been fractured by a road-roller. The main was laid in boggy or soft soil, and the roller, besides breaking the pipe, had brought it to the surface. The soft ground had been squeezed in below it. He had to open up 15 or 20 feet in length of the street before he could get the pipe down. It was a cast-iron main.

Mr. Brodie thanked Mr. Tooms and Mr. Airth for the very interesting remarks they had made upon his paper. With regard to the durability of steel mains, that was a thing which, of course, only time could tell; but he had been informed that mains had been lifted in Paris after having been down for thirty years, and that they were found in perfect condition. As to the maintenance of burners, that was a point he had been very anxious to get information about, as he had been asked a good many times to undertake it; but the terms he considered would be higher than the proprietors of the establishments would care to pay. It was, however, a subject which was bound to come to the front very much more than at present. The only difficulty, or one great difficulty, which cropped up was that local gasfitters had great objections to what they considered their territory being invaded. There was a good deal of sympathy with them, among communities, which they sometimes deserved, but which sometimes they did not. What he would like to see was gas companies and local people pulling together.

## POSITION OF COAL TAR IN CANADA.

By John Keillor, of Hamilton (Ont.).*

**[A Paper read before the Canadian Gas Association.]**

How much do we get for our tar and ammonia? The proportion in which the bye-products tar and ammonia contribute to the income of gas companies has undergone considerable change during the last quarter-of-a-century. It was during this period that any income worth speaking of from this source began to appear on the balance-sheet at all. In the very early days, "secondary products" was a very apt designation given to residual tar and liquor. Not only were they disagreeable bye-products in the manufacture of coal gas which had to be removed at considerable expense, but were a positive nuisance in the hands of the gas manufacturer—threatening to some extent to impede the rapid extension of the use of gas for illuminating and other purposes.

The pioneers of the gas industry were so intently engaged in inventing and perfecting apparatus for the economical production of illuminating gas, that little time was devoted to the investigation and practical development and disposal of the crude tar and liquor. It remained for a later-day school of gas engineers and chemists to investigate and discover the intrinsic value of the secondary products, and to establish the manufacture of new products therefrom upon a practical and commercial basis. The student of gas manufacture and bye-product distillation who takes the trouble to review its historic period cannot but feel amazed at the very large extent to which an absolutely new chemical and engineering industry has grown up out of the hitherto despised and useless bye-products. This new industry, the talons of which are deeply rooted in the system of the gas industry, and upon which it depends for its existence, has sprung up largely within the last quarter-of-a-century, and simultaneously with the rapid development which has taken place in the practice of coal gas manufacture.

It is interesting to recall that gas tar was first distilled in England on a fairly large scale about the year 1835; while in Germany it was first used in 1838 for making roofing felt, &c. At that time, however, only a comparatively small proportion of the total tar made was utilized for manufacturing purposes; and it was not until Hofmann and Mansfield had shown the presence of benzol in gas tar oil in 1845, and Perkin discovered the first of the aniline colours in 1856, that the great change

* Mr. Keillor was formerly Manager of the Peterhead Gas-Works, and went to Hamilton about two years ago.—Ed. J.G.L.

came which created demand for the secondary products of gas-works. Since then the quantity of tar used for manufacturing purposes all the world over has increased by leaps and bounds. In like manner ammonia, the principal source of which is gas liquor, has become a valuable article of commerce, and its uses have rapidly extended.

How much has the gas industry in Canada benefited by the development of this new offshoot industry of coal-gas manufacture? Are our tar and liquor still secondary products in the same sense as they were twenty-five years ago, or have we forged ahead in the matter of working-up these products, and improved our methods of marketing them to meet the new conditions which have grown up around us? Has the price received by gas companies in Canada for crude tar and liquor increased proportionately with the prices received by the distillers for manufactured products?

It is on such questions as these, dealing with the commercial side of this department, that I propose to make a few personal observations—believing that these might interest the members more at this time than a technical paper on the manufacture of commercial tar and ammonia products. My intention is to recount one or two experiences which led to our installing a plant in Hamilton to work up tar. At the same time, I take the opportunity of bringing before you in tabulated form some statistics relating to prices received by 29 companies in Canada for tar, &c., in 1907, the quantity of tar made and sold, and the imports into, and the exports from, the Dominion of tar and pitch. Through the courtesy of the managers of the various gas-works, I was able to compile Table I.; while Table II. gives the imports and exports from 1902 to 1907 inclusive.

TABLE I.

| Works. | Crude Tar Made. | Can you readily Market Crude Tar? | Did you find it difficult to dispose of Tar last Two or Three Years? | Tar Sold Last Year. | Tar not Sold Last Year. | Average Price Received per Gallon Made. | Is Present Price less than Three or Four Years ago? |
|---|---|---|---|---|---|---|---|
| | Gallons. | | | Gallons. | Gallons. | Cents. | |
| 1 | 3,000 | No | Yes | 80 | 2,920 | 0·5 | Yes, 40 p. ct. |
| 2 | 18,000 | ,, | Very | 16,000 | 2,000 | 1·7 | .. |
| 3 | 30,000 | ,, | No market | 480 | 29,520 | 0·4 | Yes |
| 4 | No record | ,, | Yes | None | No record | .. | .. |
| 5 | .. | ,, | ,, | .. | .. | .. | .. |
| 6 | 20,000 | Struggle | Yes for 75c. | 5,600 | 14,400 | 1·6 | 30 p. ct. |
| 7 | No record | No | .. | None | .. | .. | Yes |
| 8 | Wasted | None | .. | ,, | .. | .. | ,, |
| 9 | 37,000 | At times | Very | 16,000 | 21,000 | 1·3 | ,, |
| 10 | 120,000 | No | Very difficult | 40,000 | 80,000 | 1·2 | 50 p. ct. |
| 11 | .. | ,, | Yes | None | .. | .. | Yes |
| 12 | No record | ,, | ,, | ,, | .. | .. | ,, |
| 13 | 150,000 | ,, | Very difficult | 150,000 | .. | 1·8 | ,, |
| 14 | 6,000 | ,, | Very | 1,000 | 5,000 | 0·7 | ,, |
| 15 | 126,000 | ,, | Not till now | 60,000 | 66,000 | 1·3 | ,, |
| 16 | No record | ,, | No value | 1,600 | .. | .. | .. |
| 17 | .. | .. | .. | .. | .. | .. | .. |
| 18 | 8,500 | Fair market | No | 6,000 | 2,500 | 10·5 | .. |
| 19 | 27,500 | No | No demand | 16,000 | 11,500 | 2·5 | 40 p. ct. |
| 20 | 54,000 | Yes | No | 48,000 | 6,000 | 2·2 | .. |
| 21 | No record | No | .. | None | .. | .. | Yes |
| 22 | 1,013,000 | Output sold | Yes | 1,013,000 | .. | 1·9 | 33 p. ct. |
| 23 | 84,000 | Yes | No | 84,000 | .. | 2·8 | Yes |
| 24 | 30,000 | No | Very | None | For fuel | .. | Much less |
| 25 | 1,100,000 | ,, | ,, | 600,000 | 500,000 | 1·9 | 10–15 p. ct. |
| 26 | 80,000 | Yes | No | 70,000 | 10,000 | 3·5 | 10 p. ct. |
| 27 | 49,000 | ,, | ,, | 49,000 | .. | 3·8 | Same |
| 28 | 100,000 | Contract | Yes | 100,000 | .. | 2·4 | Yes |
| 29 | 8,000 | Yes | No | 8,000 | .. | 9·5 | Expect drop |

TABLE II.

| Year. | Imports. Gallons. | Imports. Value. | Exports. Value. |
|---|---|---|---|
| Great Britain. | | | |
| 1902 | 652,377 | $26,873 | $200 |
| 1903 | 558,828 | 27,037 | 215 |
| 1904 | 449,520 | 25,743 | 29 |
| 1905 | 584,036 | 24,597 | .. |
| 1906 | 512,202 | 22,669 | 1,595 |
| United States. | | | |
| 1902 | 1,119,614 | $71,673 | $14,891 |
| 1903 | 467,323 | 34,326 | 25,015 |
| 1904 | 1,481,507 | 96,855 | 24,299 |
| 1905 | 2,140,511 | 125,452 | 12,346 |
| 1906 | 2,282,485 | 131,959 | 44,133 |
| Other Countries. | | | |
| 1902 | 30 | $5 | $938 |
| 1903 | 225 | 185 | 12,400 |
| 1904 | .. | .. | 3,427 |
| 1905 | 435 | 92 | 16,300 |
| 1906 | .. | .. | 51,749 |
| All Countries. | | | |
| 1902 | 1,772,021 | $98,551 | $16,029 |
| 1903 | 1,026,376 | 61,551 | 37,630 |
| 1904 | 1,931,027 | 122,598 | 27,755 |
| 1905 | 2,724,982 | 150,141 | 28,646 |
| 1906 | 2,794,687 | 154,628 | 98,477 |
| 1907 | 2,990,395 | 162,098 | .. |

Summarized, the information contained in Table I. is as follows: Total gas-works tar made in Canada (approximately), 3,100,000 gallons. All the companies, with two exceptions, report getting lower prices for tar than they did four or five years ago. The average price received by larger companies shows a decrease of fully 33 per cent. Eight companies report "Tar allowed to go to waste; no demand." Nine companies did not sell half of what they made. Only five companies report "Tar easily disposed of during the last three years." All other producing companies report "Great difficulty in marketing tar." The average price received per gallon made was slightly more than 1½ c. To my mind, these results reveal a condition of things which does not exist in any country where there is not over-production of tar. They indicate plainly that, instead of the prices of crude tar increasing as did the market value of pitch and tarred felt, &c., during the past few years, the value of tar has greatly depreciated. What is the cause of this big slump in the value of the crude product? How has the price decreased so much in the last four or five years?

Keeping in view the substantial progress that has been made in the utilization of crude tar in Canada as in other countries, together with the knowledge we have acquired of the many ramifications of the business of tar distillation, does it not seem strange that gas companies should have to accept less for this product than they did five years ago? Keeping in view, too, the fact that the price of coal is subject to frequent change, and that higher prices have been received during the same period by tar distillers for refined tar, tarred felt, pitch, &c., is it not strange that the gas engineering profession should apparently be content with an arrangement for the disposal of their crude products which existed in the infancy of the industry? For do not most of us who can sell our tar and liquor sell it at so much per gallon, or per barrel, or per cent. strength, without any reference to a sliding-scale, quality, or method of test, in the same old-fashioned way as did our forefathers, who, unlike us, were unaware of the possibilities of working up or otherwise disposing of the secondary products more profitably? We pride ourselves, and rightly, upon the importance and greatness of our industry—upon the progress made in methods of manufacturing, and "boosting" the sale of gas. But can we pride ourselves upon the progress made in methods of handling and marketing residuals? I think not. Generally speaking, very little advance has been made by the gas industry in Canada in this department. Excepting two companies that now distil their own tar, all the others, so far as I can learn, sell the products crude in bulk without even reference to a sliding-scale.

It may be that the need of modernizing the method of disposal of crude tar in many Canadian cities was not considered necessary, because most gas companies were content to sell their whole output to tar distillers—an arrangement which was fairly satisfactory to those companies who enjoyed it as long as the tar distiller relieved them of their entire output and paid a good price. But this is not the case to-day. Gas companies no longer get a good price, and very few of them get rid of their entire output. Many companies cannot sell tar and ammonia at all under present conditions; their product is unsaleable. Most of us now have surplus tar, and the tar distillers will not buy it. Why? Personally, I think this question will stand searching inquiry, because we find they now import a large part of the raw tar and pitch from the United States and Britain, which unfortunately the Government allow to come in free. This displaces the tar made by our respective companies, and gluts the Canadian market—a very good reason why we find it so difficult to sell our product, even at low prices. This condition should not exist, because, if the Government returns are right, there is more gas tar and pitch used in the Dominion than the gas companies make collectively. Another, and equally good, reason is that a few years ago the guardians of the tar trade in Canada formed themselves into a ring, and at once made up their minds to mulct the gas industry. That they have succeeded in their efforts to do this is very apparent. Witness the low prices that are now obtainable for crude tar.

The tar business has been absolutely in the hands of the tar combine during recent years. Have they not been in a position to dictate to the gas companies what price they would pay for crude tar?—a price which, unfortunately, the gas companies have accepted far too long. I am told this combination existed for the purpose of keeping the price of the product below par. If this is true, it is apparent, even to an outsider, why we have had to accept lower prices. If the tar distillers had not been in combination, higher prices would in all probability have prevailed. The want of competing firms no doubt precipitated the slump. But whether there be competition or not, I am afraid the results to gas companies will always be unsatisfactory; and year by year as we offer our raw product for sale without conditions, the distiller will just as regularly dictate his price, knowing that it must be accepted. Why give him the chance? Truly gas companies who sell their crude tar in bulk, without reference to a sliding-scale or agreement under which they are relieved of their entire output, are in the hollow of the tar distiller's hand.

This was the position in which we found ourselves in Hamilton, when our last contract expired fully two years ago. When the tar distillers came to us, wanting a renewal at a reduced price, we intimated that we were not prepared to do this—that they must pay the same price as we were then receiving, and, moreover, must guarantee to take our whole output. The latter condition we did not think at all unreasonable, because they formerly only took

part of our output, and we had great difficulty in marketing the balance. Moreover, it was known to us that a large quantity of American tar was being imported into Canada by the "Tar Combine"—thus displacing Canadian tar—and that they could quite easily take our whole output; American tar being imported by the Combine under the pretence that they could not manufacture their goods without it. This, paraphrased, means that Canadian tar was not suitable for manufacturing purposes—a contention far too absurd to be taken serious notice of.

Our friends said we were much too exacting; that the price of tarred felt and pitch did not warrant their paying so big a price for crude tar; that the quality was very inferior; and that they would not buy our whole output, as they wished to be free to buy elsewhere. With not a single condition would they comply. I argued that, as the price of coal had increased, we were entitled to get a little more for tar; and I offered to sell the whole output on a sliding-scale basis for five years, the variations in price to correspond with the rise and fall in the price of coal on the one hand, and the price of tarred felt, pitch, refined tar, &c., on the other—an arrangement which I think should be more generally adopted. I pointed out that the conditions as they were at the time were all in favour of the buyer and against the seller. They admitted the fairness of this proposition, but would not depart from the older fashioned method of buying on their own terms. They renewed the offer on this basis at a reduced price; and we refused it.

A short time later, we decided to adopt a system which the writer had previously tried and found successful. We installed complete new plant for distilling and refining tar and manufacturing tarred felt, &c. It has now been running about eight months, and I may tell you that it is the panacea for all the ills that are likely to arise between the avaricious tar distiller and the gas company. Since we installed the plant, we have had absolute control of our tar output; regulating the running of it to suit the requirements of the works and the price of the product to suit the price of coal and other commodities. Such a plant can be operated very cheaply in conjunction with a gas plant, because such charges as cartage and freight on crude tar, rent, management, &c., are altogether eliminated; besides, the cost of steam, taxes, interest, &c., is smaller proportionately. This enables one to work up the tar very economically and make it more valuable. Of course, it means some more work and responsibility for the gas manager; but it is a mighty good thing for his company.

We found some difficulty at first in marketing the manufactured goods, on account of the Tar Combine, who ran down the price of tar, having the hardware and roofing trade all tied up. A few months ago, however, this austere body was broken, and now our products find a ready sale. At the present time we use our entire output of tar for saturating several grades of building-paper and roofing-felt, refining tar, and manufacture pitch, crude naphtha, light oil, creosote oil, crude carbolic acid, &c. Any gentleman who has trouble in marketing his company's tar would do well to give this method of disposal his careful consideration.

To my mind, the results obtained by those who work-up tar prove beyond doubt the desirability and economy of such a course. There is propably only one point on which those experienced in tar distilling have left us in doubt, and that is how small are the gas-works where it will not pay to instal plant for working-up tar. Always taking into consideration, of course, the extent of the demand for crude products, and the difference between the market values of the crude and manufactured articles in a given district, it is obvious that this is a matter for each individual to decide for himself according to local conditions, &c. Assuming, however, that the gas industry is big enough in any town or district to warrant the erection of distilling plant, it seems to me only the natural sequel to a long series of chemical operations carried on by the gas-making industry that they should finish the work they begin with the destructive distillation of coal, and themselves work-up the residual tar and ammoniacal liquor to the best advantage. This ideal may seem a little chimerical; but personally I am confident it is quite possible of attainment.

I need not make more than a passing reference to Table II., which shows the extent of the imports to, and exports from, Canada of tar and pitch. The value of the imports in 1906 exceeded that of the exports by about $60,000. The value of the imports increased in five years by no less than 264 per cent.; and it was during this period that the worth of tar to Canadian producers fell off. Gradually, as the free importations increased, the Tar Combine in Canada paid lower prices for Canadian-made tar. This Association recently presented a memorial to the Government, requesting that the duty should be taken off gas coal and imposed on foreign tar and pitch. So far as I know, the Government have not yet assented to any change in the tariffs; and it is to be hoped that further efforts will be made to show the authorities how much in need the gas industry is of relief. That the Canadian gas companies, who pay some $90,000 a year for duty on imported coal, should not at least have fair protection for their tar, pitch, and coke market (which products cost us more to produce than American companies), is to my mind a gross injustice to the industry.

*Discussion.*

The PRESIDENT (Mr. H. H. Powell, of Brantford) having invited discussion,

Mr. CARTER, the Chairman of the Commission of the Guelph Light and Power Company, said last year they obtained for their tar $1·50 per barrel, or, as they reckoned, about 80 c. per barrel net. This year, as they had no provision for storing their tar, they had to put it in barrels. But these kept bursting, and allowed the contents to run into the drains, which gave rise to trouble with the city authorities. Finally they had an offer of $1·40 per barrel from parties who were willing to take the entire output. This would have left them with a little more than 70 c. per barrel, or about 1¾ c. per gallon. Then they tried burning the tar for the production of their electricity; and they were able to price it at $1 a barrel. They started utilizing the tar under one of the boilers; and whereas their output before was only three barrels per day, they were now using eight or ten barrels. They found they could get 20 c. more per barrel for 1000 barrels, which was $200 more for the Gas Department; and they were going to save $100 to $200 on coal. He should like to ask the author of the paper whether they should get much more for their tar than 3½ c. per gallon.

Mr. KEILLOR replied that he thought they should; but they could not. As a matter of fact, at Hamilton last year they could not get 2 c. a gallon and all expenses paid; whereas five or six years ago they could get 8 c., selling the crude tar to the distillers. With regard to using tar as fuel, they burnt it under the retcrt-benches for six or eight months prior to installing the plant. The question of whether or not it would be profitable to burn tar was one which each individual must decide for himself; but he thought the figures of 2½ c. to 3 c. a gallon would agree with general experience. He had not a complete year's figures in regard to the working of his distilling-plant; but, at the very lowest estimate, the tar would be worth about 8 c. per gallon. In reply to questions, Mr. Keillor added that the size of the plant would be governed largely by local conditions. If a good price was obtained for the crude product, it might not pay a manager to work it up; but if nothing was being got, as was the case with many companies, the results must be very bad if the revenue could not be improved.

Mr. HAY: How would an Association plant work out?

Mr. KEILLOR: I am not prepared to say; but I think the idea of Mr. Powell and others to have central plants would be a capital plan, and the only way out of the difficulty.

Mr. ELWIN: Have you had any experience of gas tar in road making?

Mr. KEILLOR: Some. We are now endeavouring to get the City Council in Hamilton to purchase pitch (the residue obtained after distilling the tar) for road-making purposes. Ordinary tar is used in several places for sprinkling and painting roads.

The PRESIDENT: With regard to road work, we have had some experience in Woodstock, and it is very satisfactory. Tar is easily applied, and it makes a beautiful street. It has been tested for a couple of years on one of the leading streets, where heavy traffic from the depôts goes on, and thus far it looks like an asphalt pavement. Crushed rock was placed for 3 or 4 inches in depth on top of 2 inches of crushed rock mixed with cold crude tar and rolled, and over the top of it was the finer part or screenings of the rock sprinkled and rolled; and it is as fine a street as one would wish to look at. People are highly delighted with it. We furnished them with the tar from the Woodstock plant, and got a good price for it. We have also been using our tar for retort-bench firing, getting three times as much in value for it as we could sell it for; and we have come to the conclusion that it cost very much less than coke. We have been using it for about three years for firing our benches; and the tar-fired bench is quite the easiest to run—giving the best and most regular heat, and costing very much less for repairs and regular attendance. This meeting having been called for the purpose of the discussion of such subjects as this, I hope you are not going to let things pass without taking definite action upon them as they come up *seriatim*. It has been the lack of being able to work in a concerted manner that has brought us together. I do not believe there is any better plan than that which we are adopting. Burning tar underneath our retorts is, in my opinion, virtually throwing the greatest value of the coal away. Look what is now being done in other countries. Take Germany, the home of the greatest skill in regard to the production or utilization of the bye-products of gas manufacture. What was done there last year? They produced from coal tar $30,000,000 worth of indigo and exported it. Not $2,000,000 worth was obtained in the whole American Continent. Look along the the line of bye-products. They exported $200,000,000 worth of these. What are we doing here? We are literally throwing the gold away. From our bye-products we do not get anything like what we should do per 1000 cubic feet of gas made. How many of you get 25 c. per 1000 feet out of your products? Why should you not get it? Would it not help you in the price of your gas? I am making these remarks out of place; but I just wanted to impress this matter upon you. If there is any one thing that has induced me to take a hand in working this up, it has been the feeling of the need for us getting together for our mutual benefit and protection; and we shall not have accomplished what we ought to have done until we are all manufacturing our own bye-products.

Mr. CARTER said he should like to move that the meeting recommend to the executive officers to still prosecute their efforts to persuade or prevail upon the Government to take the duty off coal for gas-making purposes. He asked if it was this at which they were aiming—to either get a duty put on bye-products or the duty taken off coal.

Mr. KEILLOR: We want both.

Mr. CARTER asked Mr. Keillor if it was his idea that there should

be one plant for the whole Dominion, or whether it would be better, from his information, to have one or two plants.

Mr. KEILLOR thought they could have two, three, or four plants in the district.

Mr. PHILIP seconded the motion; and it was carried.

## FIRING RETORT-BENCHES WITH PRODUCER GAS.

By W. H. PEARSON, jun., of Toronto.

**[A Paper read before the Canadian Gas Association.]**

For many years I have had in mind the idea of heating retort-benches by means of gas obtained from outside producers. On a recent tour in Europe, I visited most of the important gas plants; among them being the Provan Gas-Works at Glasgow. There for the first time I saw in operation the long-contemplated process of heating retort-benches by means of producer gas. Through the courtesy of the Engineer (Mr. Alexander Wilson, M.Inst.C.E.), I was given every opportunity of examining the plant, and going fully into the results obtained. These appeared so eminently satisfactory that, on making my report to the Company, the general scheme was adopted; and at a later date the contract for its erection was awarded to Drakes Limited. My reasons for adopting this style of gaseous firing were: (1) Perfect regulation of heats and benches. (2) Small cost of renewals and repairs. (3) Saving in labour and operating.

Referring to the regulation of heats, it will readily be seen there would be but slight variations in them, as there would be a steady flow of producer gas of an approximately constant composition. This will decrease to a very large extent the difficulty now experienced with the ordinary method of firing and of maintaining the heats at an equable temperature. This undue raising or lowering of the heats, as the case may be, is caused in great measure by the cleaning and charging of the fires at regular intervals, and consequently will be abolished under the new system. Hence many of the evils that are directly traceable to varied and uneven heating—such as pitched tar and hydraulic mains, stopped ascension-pipes, lamp-black formation, &c.—will be entirely done away with.

As to the cost of renewals and repairs, benches constructed for the purpose of using producer gas would have a very much longer life than they would under the usual firing system. Since there is no furnace, and consequently no clinkering, there is very little probability of choking or burning-out in the generator part of the setting. The perfect regulation and even distribution of the gases to the proper portion of the bench around the retorts would also greatly lengthen the life of the whole setting. At the present time, in the majority of benches of nines or twelves, it is the centre portion which gives out long before the rest of the bench is out of service—thus necessitating the renewals of the setting.

With regard to the cost of labour and operation under the present system, a large proportion of the labour necessary for operating would also be responsible for the clinkering and cleaning of the fires, of which there is generally one for each bench of retorts. When firing producer gas, one or two generators, as the case may be, are used. These are controlled by one or two men on each shift—the number depending upon the quantity produced. Thus a large amount of work is saved which would otherwise be necessary for the cleaning and clinkering of the benches, as described in the preceding paragraph. Considerable labour would also be saved in the operations on the stage-floor, as by the introduction of the new system the filling of fires made necessary by the old method will be abolished. Mention should also be made of the fact that handling coke when firing direct involves the employment of a large number of tools and apparatus, which are subjected to great wear and tear. Their use will be totally unnecessary under the new method. In addition to the above-mentioned facts, it is expected that a large saving will be effected in the quantity of fuel used for firing the retorts.

Summing up the general results which can reasonably be expected through the introduction of this system, and the principal reasons for its adoption, we anticipate a better regulation of the heats in the retort-house, reduced cost of labour in operation, small outlay for renewals and repairs, the upkeep of tools, &c., together with a more even production of gas, coke, and tar. I might illustrate this system of firing by producer gas, by comparing it with the present system of cooking by gas and the old manner of cooking by coal or wood. In making this comparison the regulation of heats will be apparent to all concerned.

In writing this brief description of the plant, I have purposely avoided giving any figures as to the actual results we hope to obtain. I should prefer at a later date to furnish additional and fuller information on this subject. We anticipate having the plant in operation in the course of two or three months; and when we meet again, I hope to be able to give you the actual results obtained.

The paper, though short, aroused much interest (in view of the fact that the author's works were to be visited by the members next day), and several questions were put.

In answer to an inquiry as to the probable minimum number of retorts that could be economically fired with producer gas, Mr. Pearson said that outside producers had been used with from one to four benches, depending entirely upon their size. He thought a producer used with from four benches upwards would be economical. One small producer would operate from four to eight benches. In his case, they installed benches of twelve retorts, four tiers high, very similar in size to the ordinary benches of nine, but a little wider. Their object in building benches of twelve was the saving of floor space; for in using charging-machines height was not a factor in the cost of working. If they were charging by hand, they probably would not build more than three tiers high; but, owing to the use of charging and drawing machines, they could go higher and save the extra floor space. In England they were using one producer to each four benches; but he could not say whether or not it was more economical. Asked if the producer system could be adapted to an ordinary generator, Mr. Pearson stated that when they constructed their benches they did away entirely with the fireplace; the producer gas being introduced at three different points. At present the radiation of heat was such that it affected the centre portion of the bench to a greater extent than any other part; and the regular distribution of heat was really the chief feature. By distributing it evenly throughout the bench, one portion would not give out before the other. This would be a rather large item, as the generator part of the bench would not have to be renewed for many years. They could all realize the saving in the operation of the bench by having the heat applied evenly. With regard to fuel, they had figured on 14 to 16 per cent. per 100 lbs. of coal carbonized; but they expected to go a great deal lower than this. The members would understand that when the fire was concentrated in one or two receptacles, there was waste from clinkering and cleaning out the fire. The coal should be picked over; but the men did not do it, so there was a great deal of waste in this way. With the producer this was not the case, for there were only one or two fires; and in the case of a small water-gas generator there was no cleaning out, so that the waste was very small. Asked by the President (Mr. H. H. Powell) what kind of fuel he expected to use, Mr. Pearson replied that it was hot coke, and that he intended measuring it into the producers as he used it. He added that they took the coke just as it came from the retorts, without its being crushed or screened; and all the breeze was utilized.

## THE RECENT RECONSTRUCTION OF THE COBURG GAS-WORKS.

The gas-works at Coburg, in Thuringia, were originally constructed in 1854, and became the property of the Corporation in 1884. The constantly increasing demand for gas rendered it imperative to extend considerably the productive capacity of the works; and a complete reconstruction was carried out last year. Particulars of the work done have been given in a recent number of the "Journal für Gasbeleuchtung" from which the following information is derived.

The coal-stores are constructed entirely of reinforced concrete, and comprise six sections. This arrangement admits of the different descriptions of coal being stored separately; while in the event of the coal firing, any one section may be flooded independently of the others. Coal is stored to a height of 16 ft. 6 in.; and the strength of the reinforced concrete construction may be judged from the fact that, on the average, the walls of the store are only 4 inches thick. The coal is loaded into the store by means of tip-waggons travelling on an elevated line traversing the whole store. An elevator of 15 tons per hour capacity is provided for conveying the coal direct to a coal-breaker, whence another elevator carries it to the coal-bunker in the roof of the retort-house. The power required for handling the coal is derived from a 17 H.P. electro-motor, which takes its current from the adjacent municipal electricity works. The retort-house adjoins the coal-store and contains three beds of nine, and two beds of six horizontal retorts—all 11 ft. 6 in. in length. The foundations have been laid for another bed of retorts, which, however, has not yet been put in; and the subsequent extension of the whole of the settings for retorts 16 ft. 6 in. in length has been kept in view. The retorts are served by a De Brouwer combined charging and discharging machine, driven by electric power. It is the first combined machine of this type so far installed on a gas-works. The average time occupied in charging and discharging a retort is two minutes. Only one man is required to work the machine, and he also opens and closes the lids of the retorts at the charging end. The cost of current amounts to 0·12d. per retort charged. The discharged coke falls into trolley-cars, which pass under sprinklers, by which the coke is quenched.

The works' apparatus comprises an atmospheric condenser, followed by a water-tube condenser; two exhausters with Hahn's governors; a Pelouze and Audouin tar-extractor; a naphthalene washer; a Reutter's scrubber-condenser; and a "Standard" washer—all of 525,000 cubic feet per diem capacity. The purifier-house contains four vessels, each 21 feet square, with a hand crane for three tons load for raising the lids. The purifying house is the old retort-house of the works remodelled and provided with a new roof. The work of reconstruction was entirely carried through between April and November last year.

## AMMONIUM SULPHATE & POWER GAS FROM PEAT

This subject has lately been dealt with by Herr A. Frank in the "Chemiker Zeitung." According to an abstract of his article in the current number of the "Journal of the Society of Chemical Industry," preliminary experiments on the utilization of peat containing from 40 to 50 per cent. of water in a Mond gas-producer gave such favourable results that a large-scale experimental plant, capable of dealing with 50 to 60 tons of wet peat daily, was erected at Sodingen for the purpose of testing the suitability of different North European peats for use in gas-generators. The plant was started about the middle of May; the raw material consisting of peat furnished by the Prussian Minister of Agriculture partly in the early months of last year and partly in the spring of this year, and which had been stored in the open.

The older peat contained from 42 to 47 per cent., and that freshly delivered from 65 to 70 per cent., of water; and the contents of nitrogen and ash were 1·05 and 3 per cent. respectively, referred to dry substance. In a trial run with 45 tons of the older peat, there were obtained per 1000 kilos. of peat dry substance about 2800 cubic metres (about 99,000 cubic feet) of gas, of the following composition: Carbon dioxide, 17·4 (18·8 per cent. by volume); carbon monoxide, 9·4 (11 per cent.); hydrogen, 22·4 (25·6 per cent.); methane, 2·4 (3·6 per cent.); nitrogen, 42·6 (40·6 per cent.); and traces of oxygen. The heating value of the gas was 1400 calories per cubic metre. With the peat containing from 65 to 70 per cent. of water, a larger quantity of gas was obtained; but this contained more carbon dioxide and only 28·6 per cent. of combustible constituents, as against from 36 to 39 per cent. in the gas from the drier peat.

It is pointed out that blast-furnace gas, containing only 20 per cent. of combustible constituents, has been successfully used in gas-engines. Tests of the gas containing from 36 to 39 per cent. of combustible constituents in a 50-H.P. gas-engine showed that 2·4 cubic metres of gas were consumed per effective horse power, and no trouble was experienced from tar-mist. Thus 1 ton of dry peat yields 1160 horse-power-hours; and as the heat of the waste gas is sufficient to provide for the production of steam for the generator, and comparatively little power is required for the air and water pumps and scrubber, a yield of 1000 available horse-power-hours may be counted upon—that is to say, an amount of energy sufficient for fixing 50 kilos. of atmospheric nitrogen in the form of calcium cyanamide, or from 16 to 20 kilos. of nitrogen in the form of nitric acid. With respect to ammonia, from 77 to 80 per cent. of the nitrogen of the peat was recovered in the form of sulphate. For instance, the peat containing 1·05 per cent. of nitrogen (referred to dry substance) yielded 40 kilos. of sulphate of ammonia per ton.

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**New York Water Supply.**—According to the Engineering Supplement to "The Times," contracts for the long aqueduct which is to bring a new water supply to New York from the Catskill Mountains are being pieced out to various firms. So far the Board of Water Supply are committed to the expenditure of £5,100,000 out of an appropriation of some £12,000,000 which it can draw upon. The ultimate cost of the work is £32,000,000, the full expenditure of which belongs to the distant future. The latest contract is for the construction of 6½ miles of aqueduct between Rondout Creek and the Ashokan dam—the former being one of the sources which will feed the reservoir. It will be of concrete, 17 feet high and 17 ft. 6 in. wide, will cost some £470,000, and will require four years to construct. Work on another section of the aqueduct—extending 3½ miles near the Wallkill Valley, and to cost £260,000—will be contracted for immediately.

**Leatherhead and District Water Company.**—In the report presented at the recent half-yearly general meeting of this Company, the Directors expressed their great pleasure at being in a position to congratulate the shareholders on the prosperity and prospects of the concern. They stated that the receipts for the six months ending June 30 amounted to £4404, and the working expenses to £1962; leaving a profit of £2442. To this must be added £1018, the amount brought from the previous half year; making a total of £3460. Deducting the interest on the debenture stock, there remained £3232 available for distribution. The Directors recommended dividends at the rates of 10 per cent. per annum on the original shares and 7 per cent. per annum on the remainder. This would absorb £2068, and leave a balance of £1164 to be carried forward. The Company's Engineer (Mr. F. S. Cripps) reported that the water supply during the six months had been satisfactory in both quantity and quality.

**Frimley and Farnborough District Water Company.**—At the recent half-yearly meeting of this Company, the Directors reported that the balance on the revenue account for the six months ending June 30 was £5022. After paying the interest due on the debentures, &c., and adding the balance brought forward, it amounted to £9626, out of which they recommend the declaration of a dividend at the rate of 7 per cent. per annum, carrying forward £6223. As to the action of the neighbouring landowners respecting the new well at Greywell, the Directors mentioned that it had resulted in the Company's favour; the Judge holding that though they had the right to purchase the land, further parliamentary powers were necessary to enable them to sink a well thereon and pump water into the district. The Court of Appeal confirmed this decision; thereby invalidating the practice of many water authorities all over the country during the last fifty years. Notice is to be given for the necessary parliamentary powers to enable the Company to complete these works, and for other purposes. The Chairman (Mr. A. C. Pain, J.P.) moved the adoption of the report; and the motion was carried unanimously.

# REGISTER OF PATENTS.

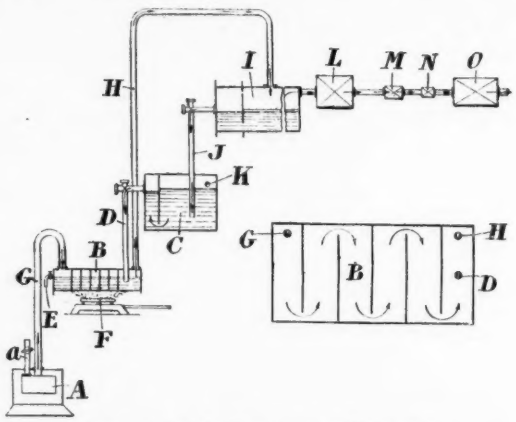
### Manufacture of Gas.

BLANC, E. E. P. M., and CATON, P. A., of Bedarieux, France. No. 17,154; July 26, 1907. Date claimed under International Convention, July 30, 1906.

This invention relates to a process for the manufacture of illuminating gas, comprising the introduction into the gas from the retorts of air carburetted with the light hydrocarbons existing in the tars, which latter are maintained at about 203° C., and the addition of benzol or a substance rich in hydrocarbons, for the purposes specified.

In the words of the patentees, the invention is based upon the following: The tars arising in the distillation of coal contain a large proportion—say, about 6 per cent. by weight—of what are termed light oils; and, as is known, it is the solid carbon in suspension in the flame which imparts to the flame its illuminating power, which increases in proportion to the combustion temperature. Proceeding from these considerations, the present invention has been devised with a view to the utilization of all the so-called light oils (and not of a few essences only as hitherto the case) for conversion into permanent gases.

The process consists broadly: (1) In the recuperation of all the light oils existing in the tars and their displacement in the state of permanent gases, by placing a certain proportion of air in contact with the tars. (2) In the introduction of this carburetted air into the gas in process of manufacture. (3) In the enrichment of the gas manufactured by benzol or other material rich in hydrocarbons. The results of these successive operations, it is said, serve ("as has never hitherto been the case") to increase the yield by 12 to 20 per cent., without affecting the illuminating power.




**Blanc and Caton's Plant for Gas Manufacture.**

The introduction and the regulation of the air to be admitted are effected by interposing on the air inlet an ordinary gas-meter (of appropriate size) provided with a cock having a dial enabling the volume of air introduced to be regulated after a series of observations. After its passage through the meter, the air is directed into a "saturator," which receives the tar after it has passed through an ordinary "decantation tank." This tar, in continuous circulation through the saturator, is there raised to a temperature of about 200° C. in such a manner as to experience a "semi-distillation"—this being done with the object of freeing it from all the light oils in it. The heating, which should be carried to a temperature of nearly, but slightly lower than, 200° C. "in order to prevent the formation of viscous coke in the saturator, takes place so much the more readily because the circulation of the tar through the apparatus is continuous, and this substance therefore does not remain in one place long enough to lose any part of its heavy oils—this being an essential point for the avoidance of obstructions." Thus the air passing from the meter into the saturator becomes charged with all the illuminating hydrocarbons liberated by the tar as it is heated.

As regards the circulation of the air, which, owing to the reduction of pressure or partial vacuum existing in the extractor, proceeds from the meter into the saturator and thence into the tar container, it should be pointed out that, owing to the heating of the tar in the saturator, this air is able to take up all the volatilized light oils. The air thus carburetted, being introduced through a permanent communication pipe, enters the barrel, where, owing to the temperature of the medium, and the existence in this medium of gases arising from the distillation of coal, it becomes intimately mixed with these latter; the whole then constituting a permanent gaseous mixture. Thus the liberation of the gas arising from the distillation of coal being aided by the reduction of pressure produced in the tar container by the extractor, it follows that the carburetted air being intimately mixed with ordinary gas, it undergoes, with it, the circulating or displacing action of the extractor. These successive saturations—*i. e.*, owing to the passage of the air through the saturator first of all, and then through the tar container—are nevertheless by way of precaution completed by the introduction, by means of a drip distributing apparatus (arranged in the path of the gas after the extractor), of a small amount of benzol or other substance rich in hydrocarbons—say, about 2 grammes per cubic metre of gas manufactured.

The accompanying illustration shows diagrammatically, by way of example, an installation for carrying the invention into practice; also a horizontal section of the scrubber employed. A is the air-meter which takes in air at *a*. B is the saturator in which the air is brought into contact with the tar—a scrubbing and baffle apparatus. It receives the tar from a reservoir C through a pipe D. The tar is discharged

from the saturator through the tube E. The saturator is heated at F. The air issuing from the meter passes through the pipe G to the saturator and from the latter through the pipe H to the tank I. The tank C receives tar through the pipe J; and the floating ammoniacal liquor escapes through the pipe K.

From the tank I the gas passes to the purifying apparatus L; and then to the extractor M. It then receives an addition of benzol through the drip distributor N; then passes to the purifiers O; and thence to the holders.

By introducing a certain proportion of air carburetted in accordance with this method into the gas, the patentees remark that the air thus carburetted having to pass with the gas through the purifiers, the continuous automatic revivification of the purifying oxides is readily obtained. The revivification resulting from the passage through the purifiers of the quantity of air adapted for the purpose, therefore, takes place simultaneously with the purification—necessitating the stoppage of the purifiers only when the purifying material is completely exhausted; but with the reservation that two or three revivifications may be effected before complete exhaustion takes place. This system renders it possible to introduce gradually the proportion of air necessary for efficient revivification into the purifiers themselves—the revivification being effected during operation, evidence of which is afforded by the mean temperature of the material contained in the purifiers, because this temperature is the necessary consequence of the chemical reaction resulting from the purification.

As regards the revivification with the object of obviating the inconvenience of the drying, and consequently of the hardening of the material (a defect prejudicially affecting the course of its action), it is advisable to moisten the purifying material from time to time, either by sprinkling it after removing the covers of the purifiers, or by injecting steam at the bottom of the purifiers. It should, however, be noted that, in order to obtain the highest efficiency, it is preferable to act upon natural oxides, homogeneous in composition and extremely porous, and to regulate the passage of the gas through the purifiers in such a manner that a velocity of 5 mm. per second is not exceeded.

The patentees conclude their specification by stating that they are aware that in patent 2849 of 1881 a process was indicated permitting of obtaining an increase in bulk in the yield of coal gas, and at the same time giving the continuous automatic revivification of the purifying materials, consisting in the introduction into the gas from the retorts of air carburetted with the light hydrocarbons existing in the tars. Their present process is, however, differentiated from this process by the higher temperature (about 200° C.) at which the tars are maintained, and by the addition of benzol or a substance rich in hydrocarbons, which has the effect, *inter alia*, "of absorbing the naphthalene and preventing it from depositing."

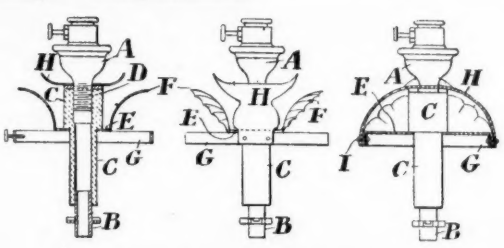
## Inverted Incandescent Gas-Burners.

TURNER, F., of Nottingham.

No. 17,442; July 30, 1907.

This invention relates to inverted burners in which the burner-tube is made of heat non-conducting material, or is separated from the mixing-chamber by heat non-conducting material.

The tip or nozzle of the burner is connected to the mixing-chamber (or to a secondary mixing-chamber, if there be one) solely by means of an asbestos tube, either moulded or sheet asbestos wrapped round and round, strengthened by wire, wire gauze, or other suitable material. Or the asbestos tube may be covered with a tube of steatite, porcelain, or other heat non-conducting material—or even metal, as long as the connection between the burner nozzle or tip and the mixing or air chamber is made by the asbestos tube itself. The mixing-chamber is thus kept very cool, the efficiency of the burner is said to be greatly increased; and the gas-fittings (the arms of a pendant or a side bracket) are kept so cool that "there is no discoloration by heat owing to the heat affecting the lacquer of the fittings." Further, the deflectors are so constructed that they disperse the products of combustion and save the fittings from being discoloured.




Turner's Inverted Gas-Burner.

In the arrangement shown, the mixing-chamber A is connected to the burner nozzle or tip B by a tube C, of asbestos, either screwed or forced on to a tube or nipple D at the base of the mixing-chamber. The deflector or head E is made of a flat piece of metal having a flat perforated part in the middle through which pass the bunsen tube and two wings F bent upwards and outwards so as to deflect the products of combustion away from the fittings and mixing-chamber. The deflector is fastened to the gallery G; and the latter is provided with a perforated bridle H connected to it.

## Manufacture of Coke and Gas.

ARMSTRONG, J., of Victoria Street, Westminster, S.W.

No. 18,196; Aug. 12, 1907.

This invention is for the purpose of making hard metallurgical coke, and at the same time saving all the bye-products (gas, tar, ammonia, &c.), from inferior coals by the application of high temperature and pressure, "which has hitherto been impossible in any other oven."

The theory of the failure of ordinary bye-product ovens to coke coals of the Lanarkshire type is, the patentee points out, the existence in the chemical composition of the coal of certain quantities of oxygen and hydrogen combined in the proportions to form water, the decomposition of which in the ordinary oven produces a violent endothermic reaction, "so much so that the heating powers of these ovens are incapable of overcoming this cooling effect, with the result that no coherent coke is formed, but simply a mass of coke powder."

On the other hand, by actual tests made in the new oven, through its regenerative principle of heating the air for combustion, it is claimed that any desired temperature can be maintained; but "it must not be overlooked that the maintenance, if it were possible, of such a high temperature in the ordinary oven would rapidly destroy it, and it is also impossible to have pressure exerted upon the coal during the coking operation."

In this invention the oven is designed on a circular plan and vertical—the circular plan being the strongest possible form of coke-oven construction where the outside walls which are permanent are never highly

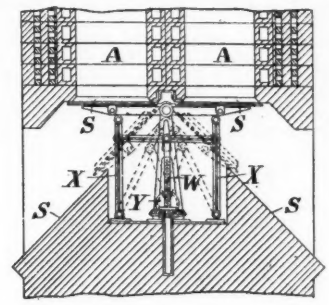
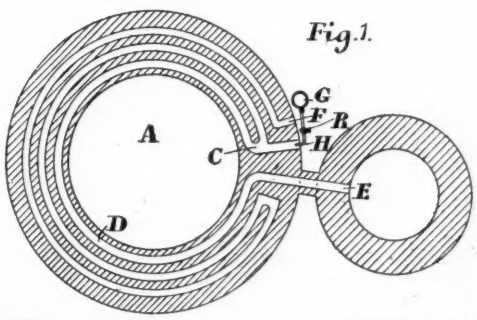



Fig. 1.



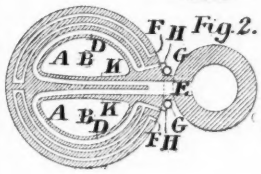




Fig. 2.

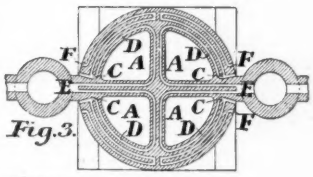



Fig. 3.

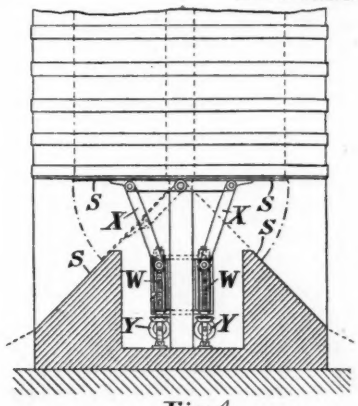



Fig. 4.

Armstrong's Coke and Gas Oven.

heated, because the air-heating flues are first carried round inside the walls, which keeps them cool and conserves their stability. The interior of the oven is formed of hollow blocks, all of segmental form, which cannot be displaced as in an ordinary oven by high temperature. This interior lining is made absolutely independent of the outside permanent walls, so that the weight of the oven is not supported upon hot brickwork, and the interior can thus be readily taken out and replaced when necessary. The oven is constructed vertically for the purpose of maintaining during the coking period the pressure of vastly larger quantities of coal than is possible by other forms of oven; "this pressure being essential in coking certain classes of coal."

Fig. 1 is a vertical section through the foundations, the mechanism for opening the bottom doors, and the lower part of the oven; also a horizontal sectional plan at the point where the section is broken off at the top—showing an oven without a diaphragm. Figs. 2, 3, and 4 show a circular oven with a diaphragm dividing it into two or more coking chambers marked A. The diaphragm may be made in the

form of an arch as in fig. 2 at K, or crosswise, fig. 3, dividing the oven into four compartments, or any other convenient number. The dotted circles B in fig. 2 represent the positions of the feeding hoppers constructed in the roof of the oven.

This oven is built with a circular outside wall, in which are formed air-heating flues F, carried round the outside wall; the cold air entering at F, thus keeping the walls cold. This air-flue then turns round, travelling immediately behind the heating flue D—the air being intensely heated and entering the combustion chamber at C.

Heating flues are constructed as shown at D, and run almost entirely round each coking chamber. They are heated by gas carried up the outside of the oven in a vertical gas-pipe G, provided with branch pipes H with movable joints and gas-cocks R. The gas is lighted at the nipples on the branch pipes H; and it then meets the highly-heated air in the combustion chamber C, producing "a very high temperature" in the heating flues D. This high temperature is carried by the waste gases of combustion into the common flue E, constructed in the permanent wall, which discharges at certain convenient places, preferably about every 3 or 4 feet into a stack built independently of the oven, but contiguous to it. This chimney flue E is in connection with a chimney shaft after passing the heated gases through boilers for raising steam apart from the oven. The heating flues D are constructed of hollow blocks of refractory material whose perpendicular joints radiate to a centre or centres; the blocks forming segments of circles. The faces of the joints are either rebated or grooved and tongued. These horizontal heating flues, with their corresponding air-heating flues behind them, are constructed one over the other, as shown in fig. 1, up to near the top of the oven. After this oven has been carefully heated to the proper coking temperature (the doors at the bottom being closed), the chambers are filled with powdered coal up to the top. During the coking period the gas given off in the lower parts of the oven deposits its heavy hydrocarbons in the upper portion of the coke, enriching it, which, under pressure, forms an agglomeration, "producing a coke harder and denser than by any other method." The gas is taken off from the coking chambers by pipes at the top of the oven, and is passed through coolers, condensers, and scrubbers in the ordinary way.

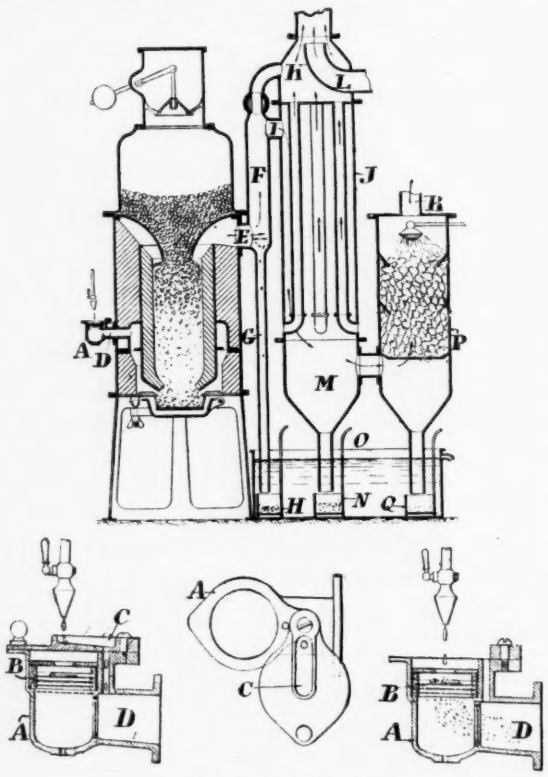
When the coking process is finished, the shaft and bevel wheel or wheels Y (fig. 4) are turned, actuating the screws W, which descend, bringing down the struts X, with the door attached, into the position shown by dotted lines, when the coke slides out of the oven, down the slopes S, where it is chilled. It is then received upon a conveyor, or may be put directly into a waggon and cooled. When this is accomplished the mechanism of the doors is reversed, and the oven is ready for another charge.

## Suction-Gas Plant.

BARDOT, E., of Paris.

No. 19,029; Aug. 23, 1907. Date claimed under International Convention, Sept. 7, 1906.

This invention, relating to suction gas-plant for the manufacture of water gas, is characterized by the following points: (1) The ordinary boiler is done away with and replaced by an automatically working spraying apparatus. (2) The cooling of the gas is effected by an automatic suction of air, without any water circulation. (3) The cleaning and the removal of dust are effected without any stopping of the gas-manufacturing process.




**Bardot's Suction-Gas Plant.**

The apparatus for distributing sprayed or atomized water consists of a bent cylindrical body A provided inside with superposed metal nets B (the upper one of which has in the centre a solid washer), surmounted at a certain distance by a removable disc provided with a central orifice. By changing the disc for another having a larger or smaller opening, the air admission is regulated. Above the spraying device is arranged a nozzle for discharging water, the flow of which is regulated by a cock. At the upper opening, the sprayer is provided with a cover, which can be horizontally turned about a pin so as to cover or uncover it. The cover is provided with a radial inclined groove C, starting from the centre and terminating with its deepest portion at a hole which, when the cover is over the spraying device, coincides with a vertical conduit arranged in the wall of the spraying device and opening into the horizontal portion D of the bend formed by the spraying device. The bottom of the bend is provided below the horizontal metal nettings B, with a discharge opening and a boss forming a division between the vertical and the horizontal portions. When the cover is open water falls direct on the washer, spreads in an annular manner on the meshes of the first metal net, and is atomized by the passage of air drawn in through the meshes. The division of the water into fine drops is still further increased by the other metal nets, so that the air drawn in and going to the furnace, in passing through the sprayer, carries with it atomized water which combines with the combustion products of the coal in order to form the explosive mixture drawn in by the engine.

On escaping from the generator, the gas passes into a cooling apparatus through a branch E of a vertical pipe F, against the wall of which the dust drawn in with the gas impinges and falls through a bottom extension G of the pipe into a removable collector immersed in water.

The gas drawn in (deprived of the coarsest dust) passes through the branch I arranged at the top of the pipe F into a tank J, through which pass vertically a series of pipes establishing communication between the outer atmosphere and a dome K surmounting the tank, and terminating at a chimney secured to the dome. Into the said dome opens an upwardly-bent end of the pipe L from the exhaust of the engine. The tank has a hopper-like extension M provided with a branch immersed in water and arranged above a tank N, which, in its turn, is immersed in a vat O. A branch connects the hopper with a washing column P, containing coke sprinkled with water and resting on a grating, which leaves free the bottom chamber of the column. The lower end of the bottom chamber terminates in a branch immersed in water, and is provided with an immersed tank Q. The column is provided at the top with a gas-suction branch R.

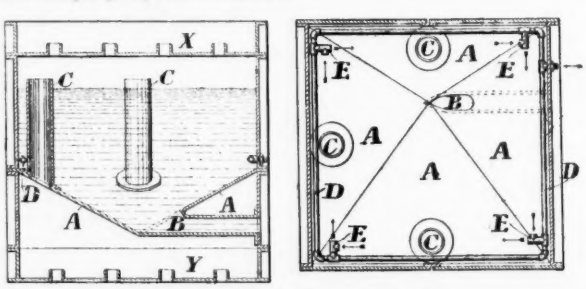
During the suction period of the engine, the gas coming from the generator passes into the tank J, and escapes after having passed from the top downwards around the pipes in J, in which, on the contrary, the air rises, which is drawn in by the gases escaping from the pipe L. It follows that the gas gives off its heat during the time it is passing through the tank J, and escapes completely cooled from the tank in order to pass into the wash-in apparatus P. During its passage through the tank, the gas deposits the greatest portion of its dust, which falls with tarry products which become condensed in the tanks H, N, Q. On escaping from the tank J, the gas is drawn through the column of coke P, where it is completely washed and deprived of its dust and other products of combustion.

## Ammonia-Stills.

HOLMES, P. F., and HOWELL, H., of Huddersfield.

No. 24,913; Nov. 11, 1907.

These ammonia stills comprise an upper portion, in which the ammoniacal liquor gives off some of its free ammonia under steam heat, an intermediate chamber (called the liming-chamber), in which lime water is introduced to mix with the descending liquor, and a lower portion, in which the liquor, now limed, gives off more free ammonia under the influence of lime. The primary object of the invention is to facilitate the removal of the sludge or heavy deposit precipitated in the liming-chamber, by making the floor or bottom of it (which may be of rectangular or other form in horizontal section) of concave or convergent form—that is, dished or conical—so that the sludge tends to settle towards the outlet or drain leading to the sludge-valve. Injectors are placed at intervals around the liming-chamber, so as to produce currents which prevent any settlement of the sludge near the periphery of the chamber.




**Holmes and Howell's Ammonia-Still.**

The illustration shows a vertical section of the portion of an ammonia-still comprising the liming-chamber, and a sectional plan of same.

X indicates the bottom of the upper chamber, and Y the roof of the lower chamber. A is the floor of the liming-chamber, which, owing to its conformation, tends to lead the sludge to the outlet B communicating with the ordinary sludge-valve. This outlet is placed about midway between the centre of the chamber and one side of it. C indicates the ordinary rising pipes provided for the passage of the ammonia from the lower chamber of the still. D is a steam-pipe surrounding the interior of the liming-chamber. It is provided at the angles, or in other convenient positions, with injectors E, producing a current in the direction shown by the arrows.

## Treatment of Coal Gases.

FELD, W., of Zehlendorf, Germany.

No. 27,568; Dec. 13, 1907. Date claimed under International Convention, June 1, 1907.

The contents of this specification are dealt with on p. 514 of to-day's issue.

## Purification of Distillation Gases.

FELD, W., of Zehlendorf, Germany.

No. 28,390; Dec. 24, 1907. Date claimed under International Convention, June 14, 1907.

This specification—like that of patent No. 27,568 (noticed above)—is dealt with on p. 514 of to-day's "JOURNAL."

## Welding Tubes.

DELLWIK-FLEISCHER WASSERGAS GESELLSCHAFT M.B.H., of Frankfort-on-Main.

No. 28,506; Dec. 27, 1907. Date claimed under International Convention, Jan. 11, 1907.

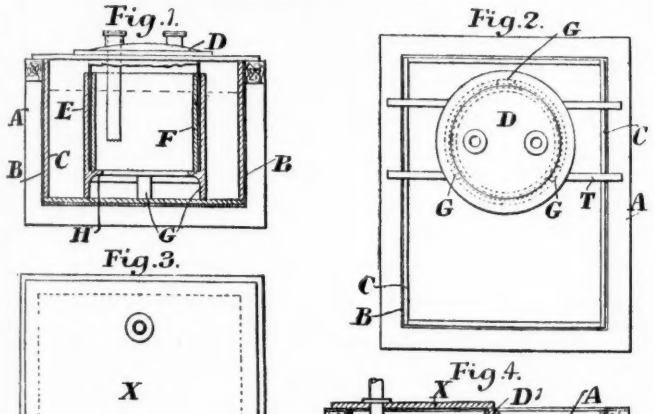
This invention relates to the manufacture of welded tubes—especially those of large diameter, and consequently of considerable thickness—in which the welding edge is heated along the whole of its length in one operation. The apparatus employed consists of a combination of adjustable gas-fired inner and outer burners for heating the unfolded welding edge along the whole of its length at one heating, arranged on a movable carriage, an inner mandrel provided with rolls, and outer welding rolls suitably driven.

## Sulphate of Ammonia Saturator.

PALLENBERG, F., of Dortmund, Germany.

No. 5657; March 13, 1908.

According to this invention, the lead or other coating of sulphate saturators is covered with acid-proof plates in order to prevent corrosion. The cylindrical walls of bells, when employed, are similarly protected; and the partition wall is also protected in a similar manner. The same effect may be attained by constructing the bell entirely of acid-proof material; but in this case the crown or cover of it should not be rigidly connected to the cylindrical part, in order to allow the latter to expand freely, and thus to prevent the bell cracking.




Pallenberg's Sulphate Saturator.

Fig. 1 shows the saturator in cross section. Fig. 2 is a plan of it. Figs. 3 and 4 show a plan and section of a saturator having a partition wall in place of the bell.

The receptacle A is lined in the usual manner with lead or other material B both on the walls and at the bottom. On the interior of the lining, acid-proof plates C are arranged which prevent the corroding of the lining. The bell D is arranged in the usual manner, and is furnished with external and internal plating E F. The external mantle has several feet G, adapted to stand on the bottom of the receptacle or its covering. Above the feet, the mantle is provided with an inwardly projecting annular flange H on which the internal protective covering F rests, and by which it is supported. The flange H is provided with an annular groove I, in which a corresponding downwardly projecting annular flange of the inner covering engages. The interstices are filled out with acid-proof putty or other material.

In figs. 3 and 4 the bell D is replaced by a partition wall $D^1$, on which the cover X is placed which encloses the space Y. The wall is protected at both sides, and also at its lower edge, by an acid-proof covering $F^1$. In the space Y a horizontal partition Z is provided (also of acid-proof material) supported on bracket arms attached to the protective covering of the partition $D^1$ and the interior covering B of the receptacle. The plates $F^1$ may be provided with feet K, to support them and the partition $D^1$ in the saturator.

# CORRESPONDENCE.

*[We are not responsible for opinions expressed by Correspondents.]*

## Seals and Pressures in Hydraulic Mains.

SIR,—In reference to the lecture by Dr. Harold G. Colman delivered on this important subject before the Irish Association of Gas Managers, as reported in the "JOURNAL" for Aug. 18, while I admit the excellence of a movable screwed socket on the overflow with which to adjust the seal on the dip pipes within hydraulic mains, it is necessary for me to say that such a device was put into practice by me long before Messrs. Trewby and Allan, of the North Middlesex Gas Company (see "JOURNAL" for April 15, 1873, p. 325).

The paper then read by me before the West of Scotland Association of Gas Managers explains fully my simple device. I required no "1-inch" bore "balance-pipe;" nor would I recommend the use of such a pipe in connection with a foul main, as the danger—should it become clogged—of syphoning the whole liquor out of the main, thus opening the retorts to direct communication with the gasholders without any seal, would be immediate and disastrous.

When my friend, the Hon. Secretary of the Irish Association, first did me the pleasure of a visit to the Dumbarton Gas-Works in 1872, he found me putting together the parts of the overflow and coupling for my seal regulator. With my seal regulator, there is no such thing as "varying consistency" of the sealing liquid, as this is wholly water; the tar being all drawn off by my arrangement. Round my upright overflow pipe is hung a cylinder, open both at the top and bottom. It is 8 inches diameter and 8 inches deep, and is attached to the coupling as shown on the diagram illustrating my paper referred to. An official in connection with a large gas apparatus works in Glasgow informed me the year after my paper was read that they were sending thousands of my arrangements abroad, chiefly to Russia, and remarked how much I had lost by not having patented my device.

I do not quite follow Dr. Colman's remarks, *re* a more uniform pressure having been obtained by the use of retort-house governors. Probably that is because I must consider myself now of the "old school." When the areas of mains in the works are properly adjusted, I do not believe that retort-house governors will do any good whatever. But I must at all events say I am very pleased to note that what is very probably a new use for the hollow bottomless tube-valve I patented in 1883 is giving for pressures in hydraulic mains as much satisfaction as the 24-inch one did at the Temple Gas-Works, Glasgow. And at Carlisle, and in other towns, my valve became valuable for reducing pressures in water-mains and preventing concussions therein. Should I be in error, I will be glad to be corrected when I say that the clause in Dr. Colman's remarks about the retort-house governor should read—"Greater uniformity has been obtained in late years by the use of the retort-house governor, first made practicable *by using Mr. Key's valve* and adopted by Mr. Charles Carpenter."

I mention the following for the first time outside the Tradeston Gas-Works. I had appointed a young man general foreman, and instructed that the valves on each side of a bench of retorts between the foul main and the hydraulic main be closed, and the hydraulic main emptied and cleaned out. The latter was done. On passing through the retort-houses one night at nine o'clock, I had occasion to go through the house which was shut down, and found a strong smell of crude gas—a pungent, smoky odour—and, calling the night foreman (Patrick Gettens by name), asked him to go up and see if the valves from which the hydraulic main connections had been removed, were tight. It was dark, being early in the year; and he called down that the smoke was coming from the valves—each 15-inch diameter. I told him to listen for any hissing sound; but there being none, he put his hand in and found that the valves were full open.

Now several hundred retorts were in active operation beyond this house, which was nearest to the exhauster-house, yet the balance maintained by an ordinary coned governor in the governor room was so fine—at level gauge. The whole of the gas being hourly and daily manufactured during the previous days of the week had passed these two large connections *open to the air* without the slightest variation on the jet photometer standing beside the "King's Gauge," which indicated the pressure or vacuum on the condenser; and my photometer tests, taken several times a day, were also unaffected, and the closing of the valves made no difference on the gauges. In face of this, I should like to get a better reason for having retort-house governors than I have yet observed on record.

WILLIAM KEY.

*St. Cyr, Ceres, Fife, N.B., Aug. 20, 1908.*

**The Potteries Federation Scheme and the Price of Gas.**—Last Tuesday, the Town Clerks and Clerks of the authorities interested received prints of the Bill to confirm the Provisional Order of the Local Government Board for the federation of the Potteries, as amended by the Committee of the House of Commons. It is for this that several of the Councils have been waiting before deciding upon the action to be taken by them when the Bill comes before the Committee of the House of Lords on the reassembling of Parliament in October. The Town Clerk of Longton (Mr. G. C. Kent) has issued a long statement explanatory of the alterations made in the Bill by the Committee of the House of Commons, in the course of which he says: "The Corporation of the new borough will fix the price of gas not exceeding 4s. per 1000 cubic feet, and not less in any existing area of supply than the price charged on Dec. 31, 1907, unless and until reduced by a resolution of two-thirds of the members of the Council or by an Order of the Local Government Board on the application of the Council or of consumers in any such area who are occupiers of one-tenth of the rateable value. Subject to the foregoing provision, surplus profits not exceeding 5 per cent. on the valuation and any additional expenditure are to go in relief of the district rate; and any balance is to be applied to reduce the price of gas generally."

# MISCELLANEOUS NEWS.

## LIVERPOOL UNITED GAS COMPANY.

The Half-Yearly Meeting of this Company was held at the Offices last Tuesday—Mr. H. WADE DEACON in the chair.

The SECRETARY (Mr. P. F. Garnett, J P.) having read the notice convening the meeting, the report and accounts for the year ending the 30th of June were presented. The latter showed that the revenue from the sale of cannel gas amounted to £488,565; for the gas used for public lighting £29,811 was received (making together £518,376); rental of meters and stoves produced £15,339; sales of residuals brought in £111,097; and the total receipts were £645,427, compared with £619,020 for the year to June 30, 1907. The expenditure included the following amounts: Manufacture, £410,761 (coal and oil costing £284,851, and the repair and maintenance of works and plant £68,589); distribution, £56,137; management, £21,057; rents, rates, and taxes, £28,419; and the contribution to officials' superannuation fund and moiety of superannuation to old officials, £4584—the total expenses being £526,541, against £506,951 before. The balance carried to the net revenue account was £118,887; and the amount available for distribution, £63,684. Out of this the Directors recommended the declaration of a dividend for the half year ending June 30 of 5 per cent. on the ordinary consolidated "A" stock, and of 3½ per cent. on the 7 per cent. "B" stock.

The CHAIRMAN, in moving the adoption of the report, remarked that the general result of the year's working up to June 30 last was much better than they had expected. On the whole, they had done very satisfactory business. The revenue account showed an increase in the cost of manufacture, owing chiefly to the price they paid for coals, which, together with other materials, cost £23,337 more than in the previous year. This was rather better than the Directors had anticipated. The salaries of the Engineers, Superintendents, and officers were £357 more; purifying materials £1191 less; and repairs and maintenance £1524 less. The distribution of gas had cost £3957 less, chiefly owing to fewer repairs being required to meters; those now in use being generally in a much better condition than formerly. Rates and taxes were a growing quantity, being £2236 more than the previous year; and he presumed they would go on increasing. The Directors had done their best with regard to the assessment; but, after all, this was a matter beyond their control. The management expenses were altogether £250 more; and insurance and compensation about the same. Last year they put aside £1000 to meet workmen's compensation claims; and they nearly hit the mark, having had to spend about £900. The increase in the quantity of gas sold was 2·43 per cent.; and it had occurred among the private consumers, the users of automatic meters, and for public lighting. It was, on the whole, most satisfactory. The total receipts from the sale of gas were £488,564—an increase of £12,896. In public lamp lighting there was an addition of £146, in rental of meters £273, and of stoves £173; so that their business showed an increase all round. Coke had done exceedingly well for them; the increase in receipts being £13,472, which was a very large item. Tar, however, showed a decrease of £2339; and he was afraid the outlook was not very hopeful. Ammoniacal liquor produced £1894 more. Subject to the approval of the dividend recommended, they had a balance of £7500 with which to start the next year. The Directors, after careful consideration, did not see any reason to make any alteration in the price charged for gas to the ordinary consumers. They would be able to go on, at all events for another year, selling gas at 2s. 6d. per 1000 cubic feet. With regard to slot-meter consumers, however, the Directors had decided to make a change. When these meters were first introduced in Liverpool, in 1891, the price of gas to the ordinary consumers was 2s. 8d. per 1000 cubic feet, and the price charged to those who used prepayment meters was 3s. 4d. Since then the price of gas had varied considerably; but the price charged to prepayment consumers had remained at 3s. 4d. The Directors had now decided to reduce the price to these by 2d. per 1000 cubic feet; thus bringing down to 8d. the difference between the two classes.

Sir EDWARD LAWRENCE seconded the motion, and it was at once carried unanimously.

On the proposition of the CHAIRMAN, seconded by Sir EDWARD LAWRENCE, a dividend was declared for the past half year of 5 per cent. on the ordinary consolidated "A" stock and of 3½ per cent. on the 7 per cent. "B" stock.

The retiring Directors and Auditor were then unanimously re-elected; and a cordial vote of thanks to the Chairman and the officers of the Company, for their services during the past year, brought the proceedings to a close.

## BOURNEMOUTH GAS AND WATER COMPANY.

### Reduction in the Price of Gas—Adoption of Co-Partnership.

The Half-Yearly General Meeting of the Bournemouth Gas and Water Company was held on Friday, at the London Offices, No. 90, Cannon Street, E.C.—Mr. G. CRISPE WHITELEY in the chair.

Mr. PLUMB (in the absence of the Secretary, Mr. Cash) read the notice convening the meeting; and the report and accounts referred to in the "JOURNAL" last week (p. 468) were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, first explained that the absence of Mr. Cash was due to a cause of domestic anxiety. Proceeding, he said that, were it not that addresses were required and desired at their half-yearly meetings, he should have been content to place the report and accounts before the proprietors without comment; merely pointing out that they were satisfactory throughout, and that they showed continued progress and the success of the undertaking. But perhaps a few words, as usual, might be desirable, more by way of amplification of the report than otherwise, with regard to the working of the half year. Of course, though everything was satisfactory, the Board had always with them anxieties with regard to the cost of coal and the price of residuals. In respect of the former, they had obtained a slight reduction; but as to what the future was going to be, the fluctuations of the market made it very difficult for him or anybody else to prognosticate. Concerning residuals, though the present accounts showed a very satisfactory state of affairs, he thought it only right to say they were anticipating the possibility—he might even say the probability—of a falling off in them. They, however, must be prepared for such ups and down. They had had them in the past, and were likely to have them again in the future; and it was the duty of the Board, in conducting the business, to be prepared for these variations. It seemed to him only the other day that he was pointing out to the proprietors, at one of their half-yearly meetings, that, inasmuch as the old gas-works at Poole had practically to make way for the new ones, the amount of capital they represented should be written off as soon as possible; and he thereupon invited the proprietors to place £6000 a year to a special account until they got rid of this expense. He was now already able to congratulate them and the Company generally that they were paying their last £3000, and might now consider the whole of the matter wiped out. This was most gratifying; and the proprietors would agree with him that it was perfectly sound finance. Their next consideration was as to what should be done to meet the satisfactory—he might almost say flourishing—condition of affairs. The Board were of opinion that it was now the consumers' turn to get their share of the prosperity of the undertaking. He need not say that the view of the Board was that the consumers' interests and those of the Company were identical, and that it was in proportion as they considered their customers that the success of the Company was assured. They had been discussing the best way of giving the consumers a share of the success attained. It had always been the policy of the Board in this matter to try to meet the actual demand of the time, and to see what direction they should take. Some years ago, they were desirous of forwarding in every way the cooking and heating portion of their gas sales; and they therefore offered a reduction of 3d. per 1000 cubic feet in order to encourage the consumers to use gas for these purposes. This had been most successful; and cooking and heating by gas were now thoroughly well established in Bournemouth as elsewhere. The result was that the make of gas during the daytime now almost equalled that which took place during the night; and the consequence was that the mains were employed nearly all the day in taking gas from the works to the consumers. This being so, they had to consider the question of lighting. There they were met with the very fierce—he might almost say acrid—competition of their electric lighting friends; and they therefore felt they were now justified, in order to meet this competition, in reducing the price of gas for lighting purposes, and bringing it down to a level with that charged for cooking and heating, so that they might have a uniform price throughout. It was therefore proposed that after next quarter-day gas should be 3d. per 1000 cubic feet cheaper for lighting purposes—making it the same as that charged at present for cooking and heating (2s. 9d.). There would be a great advantage to the public in this; and the Company would look forward to a very largely increased sale. The reduction would represent no less than £7500 a year. But such was the growth of the Company, and such were the present circumstances, that the Directors had no doubt as to the right course to pursue; and he was quite sure the proprietors would support them in their policy. There had been a very pleasant incident during the half year, in the visit to Bournemouth of the gas engineers of France. As most of the proprietors were aware, they came over to this country for a week's holiday, primarily to visit the Franco-British Exhibition. They came to the conclusion that they would like to see one of the large London gas-works, and also one country works; and they paid the Company the compliment of selecting their works at Poole for inspection. They came, they saw, and, by the reception they received, they were conquered. They were lucky in having a fine day; and Bournemouth and Poole were looking their very best. Their visitors were highly enthusiastic over their reception, and were astonished that English people should ever want to go abroad at all with such places as Bournemouth at home. There was another little incident of the half year which would give the proprietors an example of the kind of troubles and sudden excitement they came across in the work of the Company. Hamworthy Bridge was smashed into by a steamer, and the Company's gas-main broken in several parts. This took place at four o'clock one afternoon, and Hamworthy was deprived of gas. Their active Engineer and General Manager (Mr. Harold W. Woodall) and staff set to work, and notice was given to everybody at Hamworthy to turn off his gas-taps and meter. The staff set to work at the bridge, and by half-past seven next morning gas was being supplied as usual. At the last meeting he alluded to the considerable progress the Company had made during the past ten years; and it might be interesting if he now gave the exact figures. In 1898 the sale of gas was 237 million cubic feet; in 1908 it was 661 millions—an increase of 177 per cent. Regarding the supply of water, in 1898 the quantity pumped was 559 million gallons; in 1908, it was 781 millions—an increase of 39 per cent. The capital, as the proprietors knew, was now nearly three-quarters of a million; and they had more than 1200 shareholders. With such a condition of things, the responsibilities were greater and heavier. But the Board endeavoured to meet them; and, with a report and accounts like the present, he thought they might hope the proprietors would say they had met them fairly successfully. They did their best to provide Bournemouth with wholesome water, and plenty of it, so far as Nature would allow them to do so; and to supply gas at the least possible price. The success of the Company showed the success of the efforts made, and the appreciation of those with whom they were brought into contact in their business relations.

Mr. R. HESKETH JONES, in seconding the motion, said he should like to allude to the visit of the Société Technique to Bournemouth. He happened to be intimately connected with several members of that Society, and he could assure the proprietors that they went back to France much impressed by what they had seen here, and with full appreciation of the Company's invitation to Bournemouth.

The motion was carried unanimously.

Proposed by the CHAIRMAN, and seconded by Alderman S. L. RYMER, dividends were declared at the rates of 6, 7, and 14 per cent. per annum on the preference, "B" ordinary, and original shares.

### Extraordinary Meeting—The Co-Partnership Scheme.

An Extraordinary Meeting was then held in order to consider the co-partnership scheme proposed by the Directors for the approval of the proprietors.

The notice convening the meeting having been read,

The CHAIRMAN said this was another example of the efforts the Board made, he would not say to be up-to-date, but to move with the times. Some nineteen or twenty years ago, the idea of profit-sharing was introduced into gas-works, and had been carried on with considerable success. The idea was to interest those engaged in the Company's work—that their material resources should be part and parcel of the interest of the work they were doing, and that every man should feel, from the General Manager to the humblest stoker, that he was taking his part in providing a successful issue for the Company. The scheme had been arranged largely on the same lines as those on which other companies had carried out the system. Many letters had been received intimating that the writers were pleased the Directors were proceeding to introduce the system. The General Manager was very enthusiastic indeed with regard to it, and was perfectly prepared to carry it out, with his colleagues supporting him. The Chairman then moved a resolution approving of the scheme and the rules in relation thereto, and authorizing the Directors to carry it into effect, with such amendments as they might from time to time deem expedient.

Mr. CORBET WOODALL, in seconding the motion, said the Chairman had explained the object with which the Board were proposing to enter on a co-partnership scheme. This had not been hastily resolved upon; it had been a matter of discussion by the Directors for a good many months. While they did not enter upon it with any idea of obtaining from the men a largely increased amount of work, they did expect it would conduce—and they feel satisfied it would conduce—to the general benefit of the undertaking. The Directors had nothing with which to find fault in the work of the men; and at present there was no evidence whatever of any discontent on their part. There was no desire whatever for any change in the relations which existed, so far as they could judge. The men were perfectly content with these relations, and happy in them. One could not but feel, however, that to men who were in the receipt of weekly wages the opportunity of making provision for the future was very small; and this scheme, while the Directors hoped it would not largely increase the relative cost of labour, they thought would provide the means (in fact, they knew it would provide the means) whereby the men could put by money, and so make provision for the future. In some companies, as the proprietors knew, a scheme of pensions was arranged; and, from his own experience, it worked excellently. But there were cases where men had not had a sufficient length of service, or had not reached an age, to enable them to enjoy these pensions; or, if they had them, they were of comparatively small amount. Therefore a man could not, unless he commenced early, make such provision as co-partnership would enable him to do. What the Board counted upon was that this scheme would establish relations of a permanent and enduring character between the men and the Company which would conduce to the happy and comfortable working of the undertaking for an indefinite time to come. The report that had been presented showed that the scheme was not put forward because the Company were in need of some drastic change in order to improve their position. The consumers, too, were, as the Chairman had said, benefiting to-day. Now they desired also that the men should be joined together with the proprietors in a scheme that would make them participants in the prosperity of the Company, and in a manner and degree bearing a direct relation to the success attained. They knew, if the men had their interest stimulated in this way, there were always resources which could be drawn upon, and which would be drawn upon, to help that prosperity. The tendency of these days of competition was the reduction of labour. The Directors regretted it; but it was the inevitable result of the striving after the manufacture of gas or any other commodity at cheap rates. The Company had reduced the number of employees not as a total, but relatively to the business done. What they hoped, and what they were striving after, was to make gas as cheaply as possible, so as to add to its applications and consequently to the quantity in demand, and in this way to be able to increase the number of men employed, while the tendency so far had been to reduce them. For these reasons, the Board had thought fit, after careful investigation, to recommend the scheme of co-partnership to the proprietors; and he had both pleasure and confidence in seconding the resolution the Chairman had proposed.

Mr. R. HESKETH JONES said he had gone heartily into this subject, after a great deal of personal attention. He might say their rules were slightly different from those of others, as they had had to consider fully what would be best applicable to the Bournemouth Company.

Mr. R. H. GLEN inquired what the scheme was going to cost, and what would be the voting power of the employee shareholders.

The CHAIRMAN replied that the employees would, when they acquired stock in the Company, have the same voting rights as other proprietors. As to the cost, an estimate was that it would be about £800 in the half year, or £1600 a year.

Mr. CORBET WOODALL: That is after the present reduction in price.

The CHAIRMAN, referring to the point as to the voting of the employees affecting the other proprietors, said, seeing that the present capital of the Company was £730,000, it would be a long time before the employees obtained a preponderating vote. (Laughter.) Replying to Dr. Bennett, he said they would have lady co-partners in their canvassers and lecturess; and they would come in the same as the others. In fact, everybody connected with the Company would come in.

Mr. A. W. OKE said he was sure this scheme would commend itself to the proprietors. He thought it would stimulate zeal and thrift. One point was that of the freedom of contract, which was a point that he should always advocate, in the case of the employees of companies, should be thoroughly preserved. This was done under the provisions of the scheme before them. He should be strongly opposed to one which would bind men down to serve a company unwillingly. He thought the scheme would always show the employees that they were being well treated by the Company, and that their interests were very fully considered.

The motion was carried.

Moved by Mr. E. L. BURTON, and seconded by Mr. PILLEY, a hearty vote of thanks was passed to the Chairman and Directors, the chief officers, their staffs, and the employees generally.

The CHAIRMAN, having acknowledged it on behalf of the Board, spoke of their appreciation of the manner in which the Company was served. He said the Engineer (Mr. Harold W. Woodall) was attaining by leaps and bounds a position in his profession which gave the greatest possible pleasure to the Directors. They were confident he was at the beginning of a great and successful career. Mr. Cash, too, entered heart and soul into his work for the Company. So throughout the employees they were faithfully served.

Mr. HAROLD WOODALL, replying for the officers, their staffs, and the workmen, expressed regret at the absence of Mr. Cash, and at the cause. With regard to co-partnership, he felt sure the confidence shown in its success would be fully justified. The scheme was not one that had not been tried by other companies; and he wished to express his thanks to the Chairman and officers of the South Metropolitan Gas Company for the kind way in which they provided them with all the information they possibly could to assist in drafting the rules. There was one thing Mr. Corbet Woodall had said with regard to pension schemes, on which he should like to be permitted to make a remark. Pension schemes were excellent, and did good work. This Company had been very generous to their men from time to time as circumstances arose; but there was one clear difference between pensions and profit-sharing. The pension merely benefited a man financially; but under profit-sharing he gained both morally and financially.

This concluded the proceedings.

## BROMLEY AND CRAYS GAS COMPANY.

### First Meeting of the Amalgamated Company—The Act of Parliament.

The Half-Yearly Meeting of the Company was held last Tuesday at the Bell Hotel, Bromley—Mr. ALEXANDER DICKSON in the chair.

The SECRETARY (Mr. H. W. Amos) read the notice convening the meeting; and the Directors' report and the accounts of the two Companies for the half year were taken as read. The principal subject of the report was the amalgamation of the Bromley and Crays Companies. The financial paragraphs showed that the Bromley profit and loss account exhibited a balance of £10,577; and that the dividends recommended on the Bromley stocks would absorb £6848. The new Act directed that the Amalgamated Company were to pay to the holders of the new "C" stock out of the profits of the Crays Company to June 30 a dividend for the half year not exceeding the rate of 5 per cent. per annum (subject to deduction of income-tax). There will then remain the Bromley balance of £3729 to be carried forward to the next account, to which will be added by the merging of the Crays accounts a further balance of £123, or together £3852. The reserve fund balance stands at £7965; and to this will be added the reserve fund balance of the Crays Company, £2964—making in all £10,929.

The CHAIRMAN, in first moving the adoption of the Directors' report, said he would at once pass to the subject of most prominent interest; and renew to the proprietors the warm felicitations of the Board on the success that had attended the progress of the Company's Bill through Parliament, effecting as it did the unification of the Crays Company's district with that of the Bromley Company, the suppression of all conflicting questions of common powers, and incorporating the undertaking of the Crays Company in their own, so that the interests of the two might be generally developed under the most favourable conditions. This desirable issue having been attained, he thought the proprietors of both Companies would approve the decision at which the Directors had arrived not to refer in any way on this occasion to past matters of difficulty, which, after having reached the stage of litigation, had thus happily been solved, beyond perhaps saying this: That in asking the Crays Company to amalgamate with the Bromley Company, the Directors were acting on high judicial advice tendered to both Companies, and that, after the end of ten years, they had realized the object they at first expressed their willingness to promote. The Bromley Company were, under the Act, the continuing entity or body; and all their existing powers, enlarged or amended, were made commonly applicable to the whole district. The Crays Company were dissolved, and only such of their powers as were necessary for special or local purposes were retained. The standard of illuminating power was the same as previously; and the standard price also remained unaltered. The capital of the Crays Company became the "C" ordinary stock of the Bromley Company, with like privileges and conditions as the Bromley "A" ordinary stock; but with these restrictions as to dividend: That when (if such bad times should ever again come) the price of gas had to be charged at 4s. 6d. per 1000 cubic feet or more, the dividend should be 5 per cent. per annum, or less, according to the sliding-scale, and the same as that paid on the "A" stock. Then, when the price charged for gas was 4s. 2d., or anything between that and 4s. 6d., the "C" stock would still take 5 per cent. dividend, but not any higher rate, until the "A" stock dividend had reached 5½ per cent per annum. When the price charged was below 4s. 2d., as they reasonably expected it to continue to be, the dividend on the "C" stock was always to be ½ per cent. per annum below the dividend on the "A" stock. The perpetuation of this distinction arose from the difference of the dividends of the two Companies in the past, and preserved for the future the agreed equity of interest between the two sets of stockholders. As the proprietors were aware, the Bill was ultimately opposed. The Directors sought, and were granted, the first opportunity of explaining the proposals as they affected the public interests to the Bromley Corporation; and, in the result, they satisfied them that the interests under their charge were equitably safeguarded. They were also able to make like assurances, which were acceptable, to the Beckenham Council. After the Bill had passed, they received

from the latter authority a most courteous expression of their appreciation of the course the Directors had followed in meeting their views. But, alas! the rural and urban authorities in the Crays Company's district were so unreasonably insistent for unfair preferential concession, that it was impossible to satisfy them; and a wasteful contest was thus thrown upon the Company. When the impossible demands of these authorities had been bared to the scrutiny of the Parliamentary Committee, they failed to establish any one of them, and the Company's proposals as submitted were embodied in the Act. The price of gas in the two districts had always differed—Bromley being at times as much as 11d., then 8d., then 6d. less than the Crays; but these authorities contended that if, by alliance with Bromley, the economies to be obtained there would allow of cheaper manufacture, the advantage should be given wholly to the consumers in their area by levelling-down at once their price to that of Bromley, and so leaving the Bromley and Beckenham consumers without any share at all in the immediate benefits of the amalgamation. That the resolute refusal of the Directors was justified, was perfectly clear by the issue. The Bromley Corporation, through their Deputy-Mayor and the Town Clerk, supported the Company with evidence against the opposition; and the Committee maintained the Company's proposal to charge in the Crays district in the first five years a price not more than 6d. nor less than 3d., and, in the second five years, not more than 4d. nor less than 2d., above the price in the Bromley district, and then, after that period, a uniform price throughout the whole area. Perhaps the least justifiable feature of the opposition was the allegation that the Company only sought the differential rate so as to inflate their own dividends. Inasmuch as the authorities concerned received a copy of the annual accounts, the facts were known to them, or were before them, and were easily ascertainable. But it was at once established that the Company for years had not taken in dividends all the advantages the sliding-scale gave them, but had chosen to reduce the price of gas instead. It was also shown that, at least for some years to come, the surplus profits must go to meet the cost of works, and to cheapen the production, in order to realize the economies of the amalgamation. To evidence the Company's conviction that this must be the case, the Directors adopted a suggestion of their principal expert witness (Mr. Corbet Woodall), and offered to insert in the Act a proviso that the power to increase the dividend, while the differential rate was in force, should not be exercised until the difference was decreased to less than 3d. The Committee accepted the proposal, which now stood in the Act. Thus in the period of five years from June 30, 1908, they would be effecting the unification of these undertakings, and the reorganization of the works and of the administration on a scale adapting them for the combined future purpose and growth of the united areas, and until then the dividends of 6 per cent. per annum on the "A," 4½ per cent. on the "B," and 5½ per cent. on the "C" stocks would not be capable of being increased in view of the incidence of the charges on revenue; but their continuance at the old rates was, in a measure, correspondingly assured. Practically, the Bromley Company, in effecting this amalgamation with the neighbouring Company, added to their district an area of 26 square miles in which the supply of gas was being rapidly extended, and in which were well-grounded expectations of making large development. The Bromley Company having, too, the more economical means of manufacturing gas, there was the prospect of cheaper production, which would enable reductions of price to be made in the added area larger than would otherwise have been attainable, and the benefit of which—the greater share—would accrue to the consumers generally, and possibly in lesser ratio by-and-by to the amalgamated Company. The Chairman then proceeded to refer to the extension of the directorate, consequent on the amalgamation. Three Directors of the Crays Board had been added; but it was provided by the Act that the first three vacancies should not be filled up, so that ultimately there would again be seven. In the meantime, the Act directed that the Board's remuneration should be increased in proportion to the added number; and a resolution to that end would later on be submitted for adoption. There were two other Directors on the Board of the Crays Company—the venerable Chairman (Mr. R. B. Berens) and Mr. W. May—both of whom desired to lessen their public engagements; and it was agreed that these two gentlemen should receive compensation on dispossession of office. This was so provided in the Bill as drafted; but Mr. May's death removed him from the category of the Directors holding office at the passing of the Act, which was the qualification entitling to compensation. However, the accounts of the Crays Company disclosing profits sufficient for the requirements in dividend, the Directors had given Mr. May's widow £250 as a commiseration grant for the loss of the £420 which would have been payable to her husband had he lived a few months longer. A sum of £125 was also paid to the Secretary of the Crays Company (Mr. W. B. Mimmack) for extra services rendered by him, and a similar amount to the Engineer (Mr. S. B. Chandley), also in respect of additional services. In the Act they had also succeeded in obtaining the alteration of a Model Clause in one respect.* Under the Company's Act of 1902, the Directors found themselves unable to make any further issue of their "B" stock with its lower standard dividend of 3½ per cent. This stock, except in times when money was cheaper than it had been in recent years, had not reached par price. Consequently the price of issue had—necessarily and quite properly—to be below the nominal amount; and this the Model Clause did not originally contemplate or allow. By the amendment they could now issue either "A" or "B" stock, whichever was calculated to produce the most favourable price at the time of issue. They had also obtained the power to raise an amount of additional capital when required, equal to the unexhausted powers of the dissolved Company. After further remarks, the Chairman briefly commented on the accounts—first of the Bromley Company. There was, he pointed out, a satisfactory increase in the sale of gas in comparison with the corresponding period of last year; and with the increased price charged in the first quarter, which was decreased by 2d. in the second quarter, there was an increased income of £2876 from gas, meters, and minor sundries; but the returns from coke, breeze, tar, and fittings were less by £320—making the net increase of income £2556. On the expenditure side, they had an increased outlay, including the reserve for parliamentary expenses (£1400), of £2182; leaving them with a net advantage of £373 over the corresponding period of last year. Turning to the Crays accounts, he said the revenue was £12,294, which was in excess of the first half of last year by £437. The expenditure was about £404 more, so that the balance of advantage was about £33. Reference was also made, in subsequent remarks, to the question of unaccounted-for gas, and to the position of the coal market. In the latter connection, the Chairman mentioned that the Directors had completed contracts for coal with the same two collieries as before, at prices which, in the current conditions of the market, the Board considered were as favourable as could be obtained anywhere else.

The Deputy-Chairman (Mr. Bertram H. Latter) seconded the motion, which was unanimously carried.

Then quite a long series of resolutions were necessitated on this occasion, owing to the changed circumstances of the Company. First the half-year's accounts of the Bromley Company were adopted; then those of the Crays Company. Following, the dividends of the Bromley Company at the rate of 6 per cent. per annum on the "A" stock and of 4½ per cent. on the "B" stock, both subject to income-tax, were declared; then a dividend at the rate of 5 per cent. per annum, subject to deduction for income-tax, was declared payable out of the profits of the Crays Company to the persons who immediately before the amalgamation held consolidated stock in that concern. By reason of the addition of three Crays Directors to the Board, the remuneration of latter was increased to £1430.

### Recognition of the Services of the Chairman.

Mr. S. J. Wilde said it was his pleasure to direct attention to a personal matter. They all recognized the great ability, patience, and skill exercised by their Chairman in the negotiations with the Crays Gas Company, in connection with which there were many conflicting influences and difficulties. But Mr. Dickson had met them all in a satisfactory way. It took up a great deal of his time, as did also the work that he undertook while the Bill was in Parliament. Of course, the proprietors only saw the result; they did not see the details. But from his personal knowledge, he could say that they owed a great deal to the talent, the industry, and the skill the Chairman had brought to bear upon the Bill and the negotiations. He was sure the proprietors would wish to recognize in a suitable manner what their Chairman had done. He concluded by proposing a resolution tendering to the Chairman hearty thanks for his valuable services in conducting the negotiations leading up to the amalgamation of the two Companies, and authorizing the Directors to set aside out of the profits of the half year such a sum as, in their discretion, they thought fit, to purchase some article of plate for presentation to Mr. Dickson as a small mark of their appreciation of these special services.

Mr. A. Wright seconded the motion; and, on behalf of the proprietors, he expressed their warm approval of the course that was proposed by Mr. Wilde.

Mr. F. Stanger (one of the new Directors, and formerly of the Crays Board) supported, remarking that, during the negotiations, the Chairman convinced all the members of the Crays Board that he was a thorough master of the whole of the details. He endorsed all that had been said as to the ability and absolute fairness of Mr. Dickson throughout the negotiations.

The Deputy-Chairman said, in spite of all that had been said, he did not think the proprietors could appreciate the amount of actual hard work that the Chairman had undertaken, with not only the Crays Company, but the several local authorities, and in Parliament. It was a great task. He should also like to recognize the fact that the Chairman had had to work with a professional man, appointed by the Crays Company to conduct their negotiations (Mr. A. F. Phillips), who showed thorough earnestness, scrupulous fairness, courteousness, and uprightness. He desired to effect an agreement in a thoroughly equitable manner.

The motion was very heartily adopted.

The Chairman, in the course of his acknowledgment, said it was always difficult to speak of oneself and one's own work. Those who had addressed the meeting had been so good as to refer to his work in such high terms of estimation and appreciation, that he felt he could not add anything; but, with all modesty, he should like to detract a little from the extent of their appreciation. At the same time, he would not be sincere if he affected that he could not accept the meed of thanks that had been so kindly tendered to him. The task in connection with the amalgamation was, he might almost say, in a sense, one of affection. He had seen the difficulties that had arisen between the two Companies so soon after the death of his predecessor in the chair; and he felt there was a responsibility and an obligation resting upon the present Chairman of the Company to do his utmost to bring about a position of mutual understanding, and an arrangement whereby the affairs of both Companies might be carried on to the highest pitch of prosperity. Under this inspiration, he did apply himself, both in the correspondence between the Companies prior to the negotiations for agreement, and in the agreement, as sincerely and earnestly as he could to bring about so desirable an issue. The result, however, would never have been accomplished without the co-operation of all his colleagues, the members of both Boards, and the chief officials of the two Companies.

Votes of thanks were then passed to the Chairman and Directors, and likewise to the Engineer (Mr. W. Woodward) and the Secretary (Mr. H. W. Amos).

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**Accident at the Eridge Castle Gas-Works.**—A rather serious accident happened on Wednesday afternoon to some workmen engaged at the private gas-works on the Marquess of Abergavenny's estate at Eridge Castle. A heavy condenser was being lowered into position, when the overhead material became displaced, and fell in; three of the men being seriously injured. Two of them were conveyed to the General Hospital at Tunbridge Wells, where they were treated; and on Thursday night they were making satisfactory progress. Another man was seriously injured in the accident, and was removed to his home at Eridge.

* The auction clauses were remodelled at the beginning of the session and the not-below-par restriction was then swept away. See "Journal," March 17 last, p. 679.

# CROYDON GAS COMPANY.

## Visit of the Proprietors to the Works.

Spick and span looked the large works of the Croydon Gas Company at Waddon last Friday. They had not been specially tidied up for the occasion; but the further part of the works from the main entrance by the works office, in which further part all the big extensions—including the construction of a complete new section—have been made of late years, has now been finished off in a manner showing that a gas-works need not be such a place of ugliness as some of our ultra-practical engineers would condemn them to be. The Croydon Gas-Works now present features that gladden the eye of the engineer and the layman; and these features form a big combination of utility, roominess, and agreeable surroundings. The extensions, compulsorily demanded by the increasing growth of the Company's business, have been so far completed that the remodelling of the old portion of the works has now been taken in hand, and is fairly well advanced.*

The time was therefore suitable for the Directors of the Company to arrange one of the periodical visits by the proprietors which are keenly appreciated, and which give them an indication of the magnitude of their possessions at the central seat of operations, though not of that vast property in the large area of the concern represented by the distributing system and the means of utilization. The half-yearly meeting gave the opportunity; and so it came about that last Friday afternoon saw the proprietors in large numbers assembling at West Croydon Station, from which a special train conveyed them direct to the gas-works. The Chairman of the Company (Mr. Charles Hussey, J.P.), the Deputy-Chairman (Mr. Thomas Rigby), Mr. Corbet Woodall, Mr. Samuel Spencer, Mr. W. J. Russell, and Mr. Percy Hall (Mr. William Cash could not, unavoidably and regrettably, be present)—all members of the Board—were there to receive the visitors; in company with them being the Engineer and General Manager (Mr. James W. Helps), the Secretary (Mr. W. W. Topley), Mr. Helps's Chief Assistant (Mr. A. Caddick), and other members of the staff. The perambulation of the works and the information afforded were greatly enjoyed by the visitors; and their appreciation was expressed at the meeting that was subsequently held in the new recreation room on the works, as reported below.

## The Business Meeting.

The Half-Yearly Meeting of the Company was held on Friday, at the Waddon works—Mr. Charles Hussey, J.P., presiding.

The Secretary (Mr. W. W. Topley) read the notice convening the meeting; and the report of the Directors and the statement of accounts were taken as read.

### The Necessity for Capital Expenditure.

The Chairman, in moving the adoption of the report and accounts, said, before referring in detail to the past half year, he should like, on behalf of his co-Directors and himself, to express the pleasure they felt that so many of the proprietors had accepted the invitation to visit the works, and see for themselves the extensions and developments that had taken place since the last time—five years ago—they had the pleasure of meeting there. He hoped that the inspection of the works, under the guidance of Mr. Helps, their Engineer and General Manager, and his assistants, had been pleasant as well as instructive. The Directors thought that this year, which had seen the completion of a new section, forming practically an additional works of a capacity greater than the old, was a fitting one in which to let the stockholders see for themselves what the Company had gained from the money that had been expended during the last eight or ten years. It might be that some proprietors, noting the comparative frequency of the issues of capital, had had their doubts as to the wisdom of such considerable outlay by the Company. Such doubts had, in fact, been expressed by one or two proprietors at the meetings. What had been seen that day would, he hoped, satisfy them that the money had not been spent without good return in the shape of a modern works, in which they might take pride; and they should bear in mind that what had been seen was but part of the Company's additional assets. It was often said that the greater part of a gas-works was underground, in the bewildering network of pipes and apparatus that could only be seen while the works were in course of construction. In addition to this, there was the increase in the property outside the district—in mains, service-pipes, meters, stoves, and fittings. Perhaps a few figures might make clearer what he meant. He would illustrate the growth of the Company's undertaking in a few directions by a comparison of five years ago with now. In that period, they had increased the mains by 78 miles; the service-pipes by 15,056; the meters on hire, by 12,287, of an additional value of £17,556; the stoves on hire, by 9325, of an additional value of £15,508; and the annual sale of gas, by no less a quantity than 352 million cubic feet. So long as the steady and satisfactory increase in the business which these figures denoted was maintained, the proprietors would, he thought, agree that a reasonably proportionate capital expenditure was a matter not for regret, but for congratulation.

### The Business of the Half Year.

Turning now to the business of the past half year. In the six months, the increase in the sales of gas was, he thought, satisfactory; being 4·26 per cent. on a year ago. This represented in quantity nearly 25 million cubic feet for the half year. It would be readily seen that, when a business reached the magnitude to which theirs had attained, even 1 per cent. represented a substantial amount, and took a lot of getting. In money, the revenue from gas had gone up by £5900. The increase of 2d. per 1000 cubic feet accounted for some £5000 of this; but, on the other hand, the drop of price in Carshalton to the Croydon level had cost in the half year £1100. Residuals, especially coke, had yielded satisfactory results, and gave an increase of £3400, while rentals from the steadily growing number of meters, stoves, and fittings, accounted for £529; making a total increase of receipts of £11,300. The chief counterbalancing item was the cost of coal. Out of a total increased expenditure of £9300, coal (mainly due to the high prices of the year just ended) accounted for no less a sum than £7500. The gross profit for the half year was £30,167, or £2000 more than a year ago; and after provision for dividends, carrying £2000 to the renewal fund, and writing £1500 off the old Carshalton works, they would have a carry-forward of £6208, or £1751 more than last half year. This was a result which he hoped the proprietors would agree with him in regarding as very satisfactory.

### Cost of Coal and Reduction in the Price of Gas.

When he told the proprietors in February that the Directors had felt that the increase in the cost of coal—a matter entirely beyond their control—rendered necessary an increase in the price of gas, he also said that a reduction of the latter would be made at the earliest possible moment. They had now made purchases for the coming twelve months, and roughly had bought at prices half-way between those of two years ago and those of last year. In other words, they would pay, by reason of the continued high price of coal, some £6000 in the coming year more than in 1906-7. But he had the greatest pleasure in telling the proprietors that the price of gas would be reduced as from the end of this quarter by the 2d. per 1000 cubic feet which the Directors most reluctantly added only in January last, and which, as he promised in February, they would take off again at the earliest possible moment. He thought the proprietors would agree that they had fulfilled that promise.

### Remodelling the Old Works.

He mentioned just now that practically a new works had been constructed. They were now able to deal with the modernizing of the older part of the works, much of which had been doing duty since its erection forty years ago. To those who followed at all the development of the gas industry, he need hardly point out that many and great improvements had been made and adopted since then; and they could, he was sure, appreciate that the time had now come when the Company should bring this part of their works up to date. No. 2 retort-house had already been enlarged, and practically rebuilt on lines which would enable the best appliances for coal and coke handling to be used

### New Issue of Stock.

In October, the Directors would offer, by tender, £10,000 of "C" stock. With this issue, they would be raising the last of their authorized capital under the sliding-scale; the further powers having relation only to maximum dividend "D" stock and to debenture stock.

### Insurance for the Staff.

The proprietors had always so cordially concurred with the Directors in what had been done for the benefit of those who served the Company, that he was sure they would be interested to hear the result of the action taken four years ago by them when they sanctioned an arrangement whereby members of the Company's staff insured their lives, paying the premium by monthly deduction from salary, and getting exceptionally favourable terms by reason of the Company paying the premiums in one amount. The staff now numbered 66; and from figures given him by the Secretary he saw that 53 policies were now in force under this arrangement, insuring a total sum of £6600. In addition to this, the contributions to the staff superannuation fund (double the amounts of which were repayable in the case of death) made a further provision of £2345; or together nearly £9000. He thought he might safely say that the greater part of this provision against the uncertainty of life would not have been made but for what had been done by the Company.

### Territorials.

The proprietors were probably aware of the movement in this and other towns with regard to the formation of the new territorial force, and would, he had no doubt, welcome the information that liberal facilities had been offered by the Directors in regard to the annual training of any workman or other employee who might join the force, and that, as a consequence of this, and of meetings of the men arranged by the officials, in conjunction with the local officers of the territorial force, more than 50 men had joined its ranks.

The Deputy-Chairman (Mr. Thomas Rigby) seconded the motion, remarking that he should like to join the Chairman in his welcome to the proprietors that day, and to say how gratifying and stimulating it was to see so many taking such an interest in the works. They had had that day a practical illustration of the working of the new section; and he thought the proprietors generally would agree with him that great credit was due to the Engineer for not only designing but carrying out the works. They had already had experience of the economical working of the new section; and in the presence of Mr. Helps he might say that he was hoping with some confidence that they would in the future experience a little more.

A Proprietor said he noticed that £1500 had been written off in respect of the old Carshalton works. Did this, he asked, bring these works down to the present value, or was there more to be written off.

The Chairman replied that there was now only a small amount remaining to be written off; nine-tenths of the original sum having already been dealt with.

Mr. Hovenden thanked the Directors for giving the proprietors an opportunity of visiting the works. They were indeed a great credit to the Directors, the Engineer, and the staff. He hoped the Directors would take an early opportunity of readjusting the investments. Part of them seemed to be rather small amounts.

A few further remarks having been made,

The Chairman said he did not agree with Mr. Hovenden as to the smallness of the investments. They had in the reserve and insurance funds a sum together of £48,500; and when the Directors considered it necessary, they would increase these funds.

The motion was unanimously carried.

Mr. Corbet Woodall moved the declaration of dividends at the rates per annum of 14½ per cent. on the "A" stock, 11½ per cent. on the "B" and "C" stocks, 5 per cent. on the "D" stock, and 10 per cent. on the "E" stock. He said he had much pleasure in

* An illustrated description of the new section and an account of the remodelling work appeared in the "Journal" for Nov. 26 last, p. 623.

proposing this resolution. The dividends had been earned; and after making the provisions to which the Chairman had referred, there was something left over to increase the balance to be carried forward. Though it could not be seen in the accounts that the recent increase in the price of gas had had any injurious effect on the business of the Company—an increase, by-the-by, which was only maintained for nine months—the Directors were heartily glad it was now removed, and that they had now returned to the lowest price the Company had ever charged for gas. He thought it might be said that the price was not only the lowest, but it was rather lower than it had been before, because at Carshalton the price of gas, since they had absorbed the Company, had been reduced from 4s. 6d. per 1000 feet, and it would be 2s. 8d. at the end of next month, and the price at Caterham had been reduced from 3s. 10d. to 3s. 4d.; so that they might fairly claim the advantages gained by the two outlying districts of Carshalton and Caterham inured to the credit of the Company. The increase in the price of gas was not, as he had said, a large one, but anything retrograde was regrettable; and they were glad to retrace the step. The proprietors had seen the works; and he had no doubt they had come to the conclusion they were ample for the immediate and proximate demands upon them. The same could be said of the distribution plant—it was ample, so that all over the district there was an abundant supply of gas for all. What was wanted now was to increase the demand for gas, so that the capital so liberally spent might earn a due return. They wanted to find more uses and wider uses for gas; and to this end it was essential that the price should be low. These were competitive times; and they had to offer the best they could at the lowest price. The Company had entered on this path now; and he hoped that in the future they would not again be deflected from it. He was sure the prospect in front of the Company was an excellent one.

Mr. Percy H. Hall seconded the motion; and it was unanimously carried.

Mr. A. W. Oke moved a vote of thanks to the Chairman and Directors. In the course of his remarks, he said he was sure those proprietors who had never visited the works before would go away with a much better interest in the Company—feeling that employment was given to a large number of men, and that these men were carefully looked after. The buildings were not cramped; and on the site provision was made not only for the present, but for the future. The increase in the consumption of gas of 4¼ per cent. meant a great deal, in face of the modern economical burners. The consumer was getting much more for his money now; and as people more and more realized this, the proprietors would see the extra 10 acres of the site being demanded for additional business. The 2d. reduction in the price of gas was gratifying; and the writing-off of capital meant that in three or four years' time they would have no obsolete capital—in other words, the works that had been destroyed would have been replaced out of revenue. The dividends, too, would be larger than in the past.

Mr. Benjamin Green, in seconding, said those of the proprietors who had been round the works that day had seen how large they were. He had some knowledge of this kind of work, and knew how heavily it weighed upon the engineers who had to undertake it. Their works reflected the greatest credit upon Mr. Helps. He had known them from their inception—in fact, he recollected the first brick being laid on the ground; and he had taken great interest in seeing them grow. There had been much money spent upon them; but it had been money well spent, and the proprietors would never regret the investment.

The motion was cordially adopted.

### The Growth of the Concern.

The Chairman made acknowledgment on behalf of the Board, and then proposed a vote of thanks to the officers, staff, and workmen for their efficient services. Speaking of the Engineer and General Manager, he said no words were required to commend his services to the notice of the proprietors. They had witnessed that day the operation of the new section of the works which had been planned entirely by the skill, and carried out under the able superintendence, of Mr. Helps. The growth of the business since Mr. Helps had been their Engineer had been remarkable. In 1882, immediately preceding Mr. Helps's appointment, the Company made only 263 million cubic feet of gas; and in the year 1907-8 they had made 1200 million cubic feet of gas, or nearly five times as much. With regard to his staff, Mr. Caddick, his chief assistant, was able and made an excellent deputy when Mr. Helps had to be away, and Mr. Sandeman rendered excellent service in looking after the very important distribution department. A few words as to the good heart the men put into their work; and then, referring to the zealous services of Mr. Topley, the Chairman pointed out that he entered the Company's service in 1897—eleven years ago. The revenue at that time was about £118,074; while in 1907-8 it reached £237,500. He also mentioned his Assistant (Mr. Anderson) and Mr. Haines, of the rental department.

Mr. Samuel Spencer seconded the motion, with which there was very hearty agreement.

Mr. Helps, in his response, said he need hardly say that this was a very proud day for him, and was one to which he had looked forward for a considerable time. It was indeed a great pleasure to be able to show the proprietors something of what they had been doing on the works the last few years. The remarks of the Chairman and of the Deputy-Chairman were particularly gratifying to him, because they were both practical men, and their judgment was of great value. It would not be his (Mr. Helps's) fault if they did not prove that the money spent on the works was productive in the best sense of the word. He thanked the Chairman for the kind words he had said about himself and his staff—particularly of Mr. Caddick and Mr. Sandeman, and (he should like to add) his chief draughtsman, and all those who had assisted him in carrying out the new works. His men were very pleased at the treatment received at the hands of the Directors—their last act of kindness being in connection with the holidays and pay to the men who joined the Territorial force. He was very proud that his men had joined in the numbers they had done. They could only join the force between the age of 18 and 35. They had 200 men available within the age-limit; and some 60 of them had joined. He did not think any Company of their size in the kingdom—at any rate in their part of the country—had had their men join to such an extent. It had been very gratifying to him and to his assistants to show the proprietors round the works. They had seen the Company were not standing still, because, when they were building there, it showed the business was increasing.

Mr. Topley, in the course of his acknowledgment on behalf of himself and his staff, said from the figures that had been given by the Chairman as to the growth of the Company during the past few years—a growth that perhaps he was using too strong an expression in saying was phenomenal, but it was a growth that was distinctly remarkable—it would have been seen that there had been no opportunity for the officers and staff to become stereotyped. They found changing work with changing conditions.

## GAS SUPPLY IN NORTH LONDON SUBURBS.

Two reports which have recently come to hand furnish evidence of the growth of gas supply in two of the North London suburbs.

In the half year ending the 30th of June, there was an increase of 7,932,000 cubic feet, or 9½ per cent., in the quantity of gas sent out by the North Middlesex Gas Company, compared with the first half of last year; and the revenue from gas, meters, stoves, and fittings was greater by £1611. The total receipts were £19,822, and the expenditure was £15,550; leaving a sum of £4272 to go to the profit and loss account. There is a disposable balance of £6597; and at the half-yearly meeting to-morrow the Directors will recommend the payment of dividends at the rates of 5, 10, and 7 per cent. per annum on the preference, original, and additional capital, and the placing of £473 to the reserve. This leaves £3016 to the credit of profit and loss.

In the past half year, the Southgate and District Gas Company sold 5,907,000 cubic feet, or 10·14 per cent., more gas than in the first six months of 1907; and the increasing demand necessitated some important enlargement of the mains. The Company's revenue in the period covered by the accounts was £14,811, and the expenditure £11,822; leaving a balance of £2989. Out of this sum, dividends have been declared at the rates of 5, 10, and 7 per cent. per annum on the preference, original, and additional capital, absorbing £2500, and leaving £2327 to the good.

## MAIDSTONE GAS COMPANY.

The Annual General Meeting of this Company was held on Thursday, the 13th inst.—Mr. George Marsham in the chair.

The Directors reported that the accounts for the year ended the 30th of June showed a balance of £13,433 in favour of the Company, and they recommended the declaration of a dividend, less income-tax, at the rate of £7 5s. 6d. per cent. per annum, of which one moiety had been paid on the 1st of March. During the year, further capital to the amount of £8000 of 5 per cent. ordinary stock and £2200 of 3 per cent. debenture stock was raised. The business of the Company continued to show a satisfactory increase; while the recent extensions to the rural parishes showed favourable results. The works and plant had been maintained in good working order and condition. The Company had taken a lease of premises in Middle Row, High Street, as a show-room, which had proved a great convenience to the public, and brought the advantages of gas supply more prominently before the inhabitants. A new Assistant-Engineer (Mr. Frank Livesey) had been appointed, and would be a valuable addition to the staff.

The Chairman, moving the adoption of the report, remarked that, though the Company had been passing through a time of commercial depression, the business had continued to augment. If it had not done so as rapidly as in some past years, it was nevertheless continuing to move in the right direction. The revenue account showed an increase in the amount received for gas, for rent of meters and fittings, and for residuals of £3340; and the quantity of gas sold was 4¾ million cubic feet, or 1½ per cent., more than last year. In the quantity of gas unaccounted for there was a very satisfactory improvement; this having decreased from 8·09 to 5·88 per cent., notwithstanding the large addition of mileage of mains during the year. Extensions to rural parishes, Harrietsham, Lenham, and Sutton Valence, had been completed, and satisfactory business had resulted therefrom. Carburetted water-gas plant had been installed during the year, and would prove a valuable addition to the plant, especially in the event of an emergency or a sudden rise in the price of coal. The attention of the Directors had been given to the subject of the assessment of the works and mains to local rates; and a satisfactory adjustment had been made which would effect a considerable saving in the expenditure under this head. The price of residuals had been fair; and tar, which was rather low at the beginning of the year, had lately risen in price. There had been no labour difficulties; and the relations of the staff and workmen continued satisfactory. A new Assistant-Engineer—Mr. Frank Livesey—had been appointed, who was thoroughly conversant with all the modern developments of the gas industry, as might be expected in one trained under Sir George Livesey; and he was doing good work. On the whole, the Directors thought the Company might be congratulated on a satisfactory year's operations. He thought all the shareholders should do what they could to promote the development of the business by recommending friends to the Company for light and warmth.

The Deputy-Chairman (Dr. C. E. Hoar) seconded the motion.

Mr. Styles, referring to certain unpleasant transactions which had taken place during the past year in connection with the former Assistant-Secretary, suggested that it should be deemed an infringement of contract for an official to deal in any way, for personal benefit, with the shares of the Company, otherwise than through the legitimate and recognized channels.

The Chairman said the shareholders might be quite sure that the Directors would take every step to prevent anything of the kind referred to occurring again. The remarks of Mr. Styles should receive the attention of the Directors.

The report was then adopted, and the dividend recommended was declared.

The retiring Directors and Auditor were re-elected; and the proceedings closed with a vote of thanks to the Chairman.

## PROVINCIAL GAS COMPANIES.

### Increased Output at Cleethorpes.

At the recent half-yearly meeting of the Cleethorpes Gas Company, it was reported that the output of gas in the six months ending June 30 showed an increase over the corresponding period of 1907 of 6,080,600 cubic feet, or 10·18 per cent. The number of consumers had augmented by 704, and 694 additional cooking-stoves were in use on hire. The balance standing to the credit of the profit and loss account amounted to £11,252, out of which it was decided to pay a dividend at the rate of 7 per cent. per annum, absorbing £2822. A sum of £1000 was applied to renewals of works and plant; and the balance (£7430) was carried forward.

### Gas Cooking-Stoves Appreciated in Cork.

At the half-yearly general meeting of the Cork Gas Consumers' Company last Friday, the report of the Directors for the six months ending the 30th of June showed a balance on the profit and loss account of £5744, out of which they proposed to pay a dividend at the rate of 8 per cent. per annum, which would amount to £5555; leaving £189 to be added to the reserve fund. In moving the adoption of the report, the Chairman (Mr. George Lynch) said he was pleased to state that the depression in trade during the half year, in which their city had shared, and which had caused some of the English companies to have a falling-off instead of the usual increase in their sales of gas, had not so affected the Cork Company, who had had an increase of upwards of 2 million cubic feet; and the number of customers continued to augment steadily. At the last meeting, he called special attention to the use of gas for cooking; and he found that in this department of the business there was a good increase—the number of cooking-stoves now in use being more than 2300. The gentleman in charge of this branch told him that of the many people now applying for the stoves, the majority were sent by friends who had themselves been using stoves and found them most satisfactory, not only in saving trouble and in cleanliness, but also in economy. The new and improved incandescent lamps, furnishing a much larger amount of light for a smaller consumption of gas, continued to give great satisfaction, and to uphold the reputation of gas as the best and cheapest illuminant. Mr. F. W. Mahony seconded the motion; and it was carried unanimously.

### Steady Growth at Salisbury.

On the occasion of the annual meeting of the Salisbury Gas Company last Wednesday, the accounts presented showed that the revenue for the year ended the 30th of June was £24,612, and the expenditure £20,679; leaving £3933 to be carried to the profit and loss account. The balance available for distribution was £3170; and the Directors recommended the payment of the usual dividends. In their report they stated that the accounts showed that the advance in the cost of coal had been covered to some extent by increased receipts for gas and coke; and the steady growth in the sale of gas, which has been a notable feature for some years past, had been continued. There was an excellent demand for coke during the year; but the market for tar and sulphate had been somewhat depressed. The Directors expressed their pleasure in announcing that they had decided to reduce the price of gas to 3s. per 1000 cubic feet as from the 29th of September. The Chairman (Mr. George Fullford, J.P.), in moving the adoption of the report and accounts and the payment of the usual dividends, said the work of the Company during the past year had been satisfactory; and he could again congratulate the shareholders on the position of the business. This was accurately presented by the opening paragraphs of the report. It was no new story to tell the shareholders that the works and plant were in excellent order. New mains had been laid in several parts of the district, and the supply to Harnham had been enlarged. The uncertain conditions as to the future cost of coal were still a matter of some anxiety. But contracts for the next twelve months had been concluded; and depending, as they had reason to anticipate, on a continuance of good business, the Directors had decided to reduce the price of gas to 3s. per 1000 cubic feet, which would take effect on and after the 1st of October. Their valued Engineer and Manager (Mr. Norton H. Humphrys), whose abilities the Directors had observed with much satisfaction had been recognized in his profession by his election as President of the Southern Association of Gas Engineers and Managers for the current year, kept a vigilant eye on any new inventions of proved utility; and the Directors were always willing to support him in maintaining and improving the works. A formal vote would be submitted as usual; but he would like to acknowledge from the chair, on his own and co-Directors' behalf, the able manner in which the Company were served by their official and clerical staff and employees. Mr. W. Young seconded the motion; and it was carried unanimously. Mr. A. Tucker proposed a vote of thanks to the Chairman, Directors, and staff of the Company for their services during the past year. Mr. S. Grove seconded the proposition, which was carried with applause. The compliment was acknowledged by Mr. A. Watson on behalf of the Board, and by Mr. Humphrys on the part of the staff.

### All Round Increase of Business at Sutton.

At the recent half-yearly meeting of the Sutton Gas Company, the Directors reported that the consumption of gas for the six months to June 30 last was 3,880,700 cubic feet more, and the revenue account £1982 higher, than in the corresponding period of last year. The profit and loss account showed a balance of £12,834, from which they recommended the payment, under the sliding-scale, of a dividend at the rate of 5¾ per cent. per annum, less income-tax, for the half year. The Chairman (Mr. F. Budgen, J.P.), in moving the adoption of the report, said it was again the Directors' pleasure to place before the proprietors what they considered a very satisfactory balance-sheet. He was also glad to state that the past half year had been a very successful one. Generally the business had increased all round—ordinary consumers by 119, or 4½ per cent.; slot consumers by 214, or 9 per cent.; cookers, including slot cookers, by 255, or 10 per cent.; and gas-fires by 79, or 28½ per cent. The quantity of gas sold was also greater by 4 per cent. Considering the extra cost of coal and the general depression in trade, the Directors were fortunate in being able to place before the shareholders such a balance-sheet as they had presented. They might congratulate themselves on the condition of the Company and the continued growth of the business. Mr. T. Charles seconded the motion. Mr. Humphris put several questions in regard to the accounts; and these having been answered by the Chairman, the report was adopted. The dividend recommended was then declared; and a vote of thanks accorded to the Directors and staff, and acknowledged by the Chairman, concluded the proceedings.

### Another Successful Year at Taunton.

At the annual general meeting of the Taunton Gas Company last Tuesday, the Directors reported that the quantity of gas sent out in the twelve months ending the 30th of June was 103,416,000 cubic feet; being an increase of 5,031,500 cubic feet on the output in the preceding year. The great increase in the demand for gas, following similar conditions in previous years, had rendered necessary the addition of a gasholder, purifiers, and other plant to provide for it. The accounts showed that a sum of £7885 was available for distribution; and the Directors recommended the declaration of dividends at the rates of 5, 8, and 7 per cent. on the preference, consolidated "A," and new ordinary stock and so-called "yellow" shares. This would absorb £3720. The Directors recommended that the additional dividends of 1 per cent. and ⅞ per cent. respectively payable under the sliding-scale should be transferred to the reserve fund account. The Chairman (Mr. Jonathan Barrett), in moving the adoption of the report, congratulated the proprietors on the continued prosperity of the Company. He remarked that, owing to extra expenditure incurred on new pipes, and the fact that the price of coal and oil had risen, the profits showed a slight falling off to the extent of £473 compared with the preceding year. The Directors had, however, been able to obtain a reduction in their present coal contracts, which would mean a substantial saving in the future. Taking all things into consideration, and with the prospects of a much larger increase in their business, there was every reason to believe that the profits next year would be greater than they had ever been before. The Deputy-Chairman (Mr. W. H. Fisher) seconded the motion; and it was carried. The dividends recommended having been declared, and the services of the Chairman and Directors acknowledged, a vote of thanks was accorded to the Secretary and Manager (Mr. A. J. Edwards) and the staff; it being recognized that the continued success of the Company, in face of great competition, was in a large measure due to them. Mr. Edwards, in reply, said that what he had been able to do for the Company had been a pleasure to him; and he acknowledged the help he had received from the members of the staff. He thought there was every prospect of the business of the Company developing in the future as it had done in the past.

### A Good Half Year at Wakefield.

At the half-yearly meeting of the Wakefield Gas Company on Monday last week, the accounts presented showed that the revenue from the sale of gas in the six months ending the 30th of June was £17,435; meter and stove rentals produced £2052; the sale of residuals brought in £5338; and the total receipts amounted to £24,871. The expenditure on the manufacture of gas was £12,596, inclusive of £7638 paid for coals and £3153 for the repair and maintenance of the works and plant; on distribution, £2950; and on management, £655—the total expenses being £17,976. The balance carried to the profit and loss account was £6895, and the amount available for distribution £10,849. The Directors recommended that out of this sum, after paying the prescribed dividend on the 4½ per cent. preference stock, dividends should be declared as follows: £5 15s. per cent. on the £25 shares, a like amount on the £5 shares, £4 10s. per cent. on the £5 "B 5ths" shares, and £4 5s. per cent. on the fully-paid new ordinary £10 shares. In moving the adoption of the report and accounts, the Chairman (Dr. W. A. Statter, J.P.) pointed out, that, notwithstanding the high price of coal, the Company had not increased the charge for gas; and he expressed his pleasure in stating that they had had one of the best half years in the history of the Company. They had sold 139,481,800 cubic feet of gas, which was an increase of 5¾ millions; the result being that the income was higher by £1000, which enabled them to pay the same dividend as before, make a contribution to the cost of alterations at the works, and carry a larger balance forward. The prepayment meter business was also growing; 1,165,870 pennies, weighing upwards of 10 tons, having been taken out of these meters during the half year. In the matter of residuals, tar was very unsatisfactory; but coke and ammoniacal liquor were about the same as previously. The Vice-Chairman (Mr. G. A. Moorhouse) seconded the motion; and it was carried. The dividend recommended having been approved, and the retiring Director (Mr. J. B. Alexander) and the Auditor (Mr. C. Hopkinson) re-elected, a hearty vote of thanks was accorded to the Chairman and Directors for their careful attention to the business of the Company. In replying to it, the Chairman proposed a similar vote to the Engineer (Mr. H. Townsend), the Secretary (Mr. W. H. Parker), and their staffs; and it was duly acknowledged.

### Increased Business and Capital at Weymouth.

The report presented by the Directors of the Weymouth Gas Company at the half-yearly general meeting last Thursday opened with the satisfactory statement that the main portion of the Company's business—that of gas supply—showed a substantial advance in the six months ending the 30th of June, and that the residual products had yielded a much larger return. The quantity of gas sold was 53,218,500 cubic feet, which, compared with the first half of 1907, was an increase of 3,186,900 cubic feet, or 6·3 per cent. The money value of the gas sold, notwithstanding that the price during the Lady-day quarter was 2d. per 1000 cubic feet less than it was a year ago, was £242 in excess of the corresponding half of 1907. The profit on the half-year's working (£2342) was more than enough to pay the interest on the debenture stock and the maximum dividend on the ordinary stock; and the Directors therefore recommended that a dividend on the latter stock should be declared at the rate of 5 per cent. per annum, less income-tax. The matter of the re-assessment of the Company's undertaking for rating purposes was before the Assessment Committee and the Directors for nearly two years—the Directors not being able to agree to the Committee's valuations. The amount in question being large, they considered

it necessary to appoint a professional valuer, who interviewed the Committee, and a revised valuation was submitted; and this, though higher than the Directors considered it should be, they had decided to accept. The new assessment was 27¼ per cent. more than the old one, and meant that the charge upon the Company for local rates was about 2⅛d. for every 1000 cubic feet of gas sold. To meet the cost of the new gasholder and tank which had been erected and to cover the several sums which had been spent in excess of the capital paid up, the Directors considered it necessary to increase it. In moving the adoption of the report, the Deputy-Chairman (Mr. J. G. Rowe), who presided in the absence, through temporary indisposition, of the venerable Chairman (Mr. J. E. Robens), congratulated the proprietors on the continued prosperity of the Company. He said the business in the past half-year had shown an increase of upwards of 3 million cubic feet, which lay largely in the demand for gas for household needs; and this he regarded as the backbone of success. A large tax had, by the re-assessment of their property, been put upon the undertaking, which was rated more than one-fourth higher than under the old scale. The profit on the working was highly satisfactory, allowing of the payment of the maximum dividend; and the excess was equal to future demands upon increased capital. The development of the works had brought the power of supply in advance of the demand; the new gasholder being formidable evidence of ample storage for many years to come. Of the benefits accruing to the shareholders, the consumers had had their full share of advantage in the several reductions made in the price of gas; so that the interests of the maker and the user were identical and mutual. Mr. S. J. Fowler, seconding the motion, said he thought the shareholders had much to be thankful for. They were very glad indeed to see that all the details of alteration and improvement had, in the hands of their Engineer and Manager (Mr. D. F. Colson), been productive of the results they had before them. It was not a one-man job; it was a co-operation of all concerned in pulling one way. They were all practically a kind of co-operative undertaking. The motion was carried. A vote of thanks having been accorded to the Chairman and Directors, the Chairman proposed a similar vote in respect of the Engineer and Manager, Secretary and Accountant (Mr. E. Y. Wood), and all the officials, for the way in which they had devoted themselves to the service of the Company. Mr. Colson and Mr. Wood having acknowledged the vote, an extraordinary meeting was held, at which it was resolved to increase the capital by the issue by tender of £10,000 of ordinary stock.

## ALDERSHOT GAS AND WATER COMPANY.

### Reduction in the Price of Gas.

At the Half-Yearly General Meeting of the Aldershot Gas and Water Company, the Directors reported that the total revenue in the six months ending the 30th of June was £29,070, and the expenditure £21,493—leaving a surplus of £7577; and they recommended dividends at the rate of £11 9s. per cent. per annum on the "A" shares, £8 19s. per cent. per annum on the "B" shares (these rates being in accordance with the sliding-scale), and £7 per cent. per annum on the "E," "F," and "G" ordinary shares, all less income-tax. In the quantity of gas accounted for during the half year there was an increase of 3·1 per cent.; but allowing for the reduction on contracts due to the adoption by the War Department of incandescent burners in the barracks, and economies at the Company's various works and offices, the sales of gas for private and public consumption were greater to the extent of 6·8 per cent.

The CHAIRMAN (Mr. A. F. Wilson), in moving the adoption of the report, said it was as favourable as any the Directors had ever presented. Having dealt in detail with the various items in the revenue account, he said he looked upon gas as a progressive element of prosperity of the Company. They had in water a very excellent mainstay. But they never forgot that the consumption of water was limited to the parish of Aldershot and to the necessities of the Government; and they never felt they had the same prospect of increase in water as they had in their gas consumption. They had a very large area in which their gas was used. The increase in Aldershot itself had not been great; in the out-districts it had been more than one would believe. Among other things, the Directors had noticed that a considerable proportion of this was due to the consumption of gas in cooking appliances, and lately, to some extent, for power for small engines and driving machinery; and they had debated with themselves the advantages of this and the cost of production, so that they might hit upon some scheme to favour, as far as possible, this additional means of revenue. Some time ago, they reduced the price of gas in the out-districts for cooking, heating, and power purposes. The change took effect on the 27th of July. They had since then resolved to lower the price of gas for ordinary consumers in the out-districts 2d. per 1000 cubic feet, bringing the figure down to 3s. 3d.; and as from the 1st of January they had decided to reduce the price of gas in Aldershot 1d. to ordinary consumers. This brought it down to 2s. 6d., as it was in 1839. Besides this, they would give the slot consumers in the town 24 cubic feet instead of 23 cubic feet of gas for 1d. This was equivalent to a reduction of 1¾d. per 1000 cubic feet. In all this he hoped it would be recognized that the Directors had very much at heart not only the interests of the Company but also those of the consumers at Aldershot and in the out-districts. As part of the district of Aldershot, the Company had the War Department to look to; and they had, during many years, done their utmost to meet their requirements in, he thought, a satisfactory manner. The Department had in future to consider the employment of power engines, and they could have the Company's gas at a very cheap rate for this purpose. They ought, in his opinion—if he might be allowed to say so—to adopt it for their cooking and other domestic purposes in the camp. It was almost strange to see the camp with the old-fashioned cooking-ranges such as they used forty years ago, when they could have a clean, comfortable, cheap gas cooking-range. He thought that the Department were alive to this, and were considering the question.

In answer to questions, the CHAIRMAN stated that the Balloon Department had asked for gas; and the Directors hoped this might form part of the War Department's requirements, now that aërial warships were so much to the front. The suggestion that they should use gas for cooking purposes had been made to them for years; and he thought it would come to something in time.

The report was adopted.

## PUBLIC LIGHTING OF GRAVESEND.

### The Cost of Electricity.

The Gravesend Town Council have lately had rather a warm discussion on the subject of the public lighting of the borough. Various tenders had been received for electric arc lamps; but the Engineer (Mr. C. F. M'Innes) expressed his regret at finding that they were all in excess of the estimated cost of the work—£420. Of this sum, £100, the price of additional lamps, was to be charged to capital account, and £320 to be paid out of revenue—half by the Lighting Committee, and the balance out of the electricity supply surplus. He added that it would appear to be necessary to readjust the figures. The Lighting Committee accordingly recommended that the matter be deferred for twelve months.

Mr. Schultz asked how the Committee could pay out of the revenue, and where the electricity supply surplus was. The Town Clerk (Mr. H. H. Brown, B.A.) replied that the rates were the revenue. The word "revenue" was used to distinguish between revenue and capital. Mr. Schultz went on to say that the present cost of the arc lamps was £27 or £28, whereas the new lamps would cost only £19 5s. per annum. They were told that the saving effected would be about £300 a year, and that the light would be kept on all night. If this were so, why defer the alteration for twelve months? The fact was the ratepayers were getting altogether sick of this undertaking. Let them consider the enormous price that was being paid for the arc lamps, and the statement that the price could be reduced hundreds of pounds. Yet it was not proposed to effect this saving, because the cost would be £135 more than was estimated. The best thing for the Council to do was to take into consideration the whole question of public lighting. A few days ago he was looking at what Acton had done. The Acton Council possessed their own electricity works, and were paying £1780 a year for public lighting. It was proposed by the Chairman of the Finance Committee, and carried, that they invite tenders for public lighting from the owners of a competitive light. The result was that the Council, though possessing their own electric plant and lighting system, accepted the tender of the Brentford Gas Company; the alteration being effected because the Company agreed to do the lighting for £400—a quarter of the previous cost. If Acton considered such a procedure to be for the best interest of the ratepayers, Gravesend should clearly do the same. The present system meant that the ratepayers in Gravesend had to pay an extra sum for public lighting for the sake of bolstering up the electricity business. It was monstrous. He moved, as an amendment, that the minute be referred back.

Mr. Elliott, in seconding the amendment, said he considered the electricity undertaking had answered its purpose, as it had put the owners of the gas-works upon their mettle, with the result that they had improved their methods, and were now strong competitors with the Council. He had no *animus* against the undertaking, as had been supposed; it was its management that had failed, because of the yearly changes in the constitution of the controlling powers. They had the best men of the Corporation upon the Electric Lighting Committee; but he thought the time had come when they should dispose of the undertaking to an independent combination, for he maintained that it was now a monumental exhibition of municipal folly.

Mr. Archer remarked that the concern might be what the last speaker had said; but it was nevertheless the property of the ratepayers, and should receive the assistance of their representatives. As to the statements made by Mr. Schultz, he would not say they were incorrect, but they were "terminological inexactitudes;" for nothing of the kind had been said about the change of the lamps in the main road resulting in a saving of hundreds of pounds. What was said was that the saving would be something like £80 the first year and an increased reduction in succeeding years. But, in view of the present prices, the cost would be more than they had estimated for, and therefore it was well to defer the matter for twelve months.

After some further discussion, the amendment was put and lost, and the Committee's recommendation agreed to.

**The Affairs of Mr. H. K. Kindler.**—At the Maidstone Bankruptcy Court on the 12th inst., before Mr. Registrar Englefield, the public examination of Herbert Kell Kindler, formerly Assistant-Engineer to the Maidstone Gas Company, to whose insolvency and matters arising therefrom reference has already been made in the "JOURNAL," was resumed. The debtor's statement of affairs showed that he had creditors to the amount £19,288 (the greater part unsecured), and that the assets were estimated to produce £680. He was subjected to a searching examination by the Official Receiver (Mr. R. T. Tatham), during which he presented a most abject appearance; and at its close the inquiry ended, subject to the debtor signing notes.

**Reductions in the Price of Gas.**—The Directors of the Liverpool United Gas Company have decided to reduce the price of gas supplied through prepayment meters from 3s. 4d. to 3s. 2d. per 1000 cubic feet. The Directors of the Aldershot Gas and Water Company have reduced the price of gas as follows: In the out-district 2d., and in Aldershot 1d., per 1000 cubic feet; and slot-meter consumers will receive 24 instead of 23 cubic feet of gas for 1d., which is equivalent to a reduction of 1¾d. per 1000 cubic feet. The Directors of the Tamworth Gas Company have decided to reduce the prices charged for all gas supplied for lighting purposes through ordinary meters by 2d. per 1000 cubic feet as from the Michaelmas quarter; and, in order to encourage the use of cooking-stoves by slot-meter holders, to discontinue charging rents on these stoves as from June 30. The Directors of the Salisbury Gas Company have decided to reduce the price of gas to 3s. per 1000 cubic feet as from the 29th prox.

## THE DISPOSAL OF BRONZE COINS.

### Experience in Manchester.

In the last number of the "JOURNAL" (p. 476), reference was made to the death of Mr. Alder, who was known as the "Copper King." The circumstance has brought out some interesting facts concerning a similar personage in Manchester, who made an attempt to "corner" what was practically the copper supply of the city. They were recorded as follows in the "Manchester Courier" last Wednesday.

The London "Copper King" made a profit out of his energies by getting a commission from the suppliers of the pennies for their disposal, and a further payment from the people to whom he transferred them. The Manchester man who attempted to do likewise—and who did so, in fact, though on a much smaller scale—was an Ancoats pawnbroker named Hartley, who was famous some years ago as the "Poor Man's Banker," and who is now dead. His conception of larger operations seems to have blossomed about ten years ago; and the proposal he made was that he should take over all the Gas Committee's coppers, for which service he should be paid 3d. per pound sterling. This was at a time when the proprietors of automatic meters and others whose business brought them big stocks of pennies had the greatest difficulty in converting them into more usable coin—banks refusing to take copper to any practicable extent.

An interesting table, compiled by Mr. Frederick Price, the Deputy-Superintendent of the Manchester Gas Department, gives some idea of the difficulties of the problem. It is as follows:

Fifty pennies weigh 1 lb. avoirdupois.
In £5 sterling there are 1200 pennies, weighing 24 lbs.
In £100 there are 24,000 pennies, weighing 480 lbs., or 4 cwt. 1 qr. 4 lbs.
A ton of pennies contains 112,000 coins, of the sterling value of £466 13s. 4d.
A million pennies will weigh 8 tons 18 cwt. 2 qrs. 8 lbs., and would equal £4166 13s. 4d.

The method of disposal was for the collector to bring in the money to the gas office, where it would be packed into sacks and sent out next day with a clerk in a cab to be got rid of to the large business establishments. It often happened that a collector took £5 during a day; and the effect of this continual carrying of 24 lbs. of copper daily on the right arm was that the health of the collectors began to break down. The ambitious tender from Ancoats must have been tempting to the authorities just then; for it was in that year that the number of automatic meters jumped up from 13,959 to 22,761, and the problem was most pressing. It was not till five years ago, however, that a solution was found, and then it was suggested that the collectors should get rid of the copper as they got it in the shops of the districts they dealt with. This has been found to work very well; and nowadays the difficulty has quite gone. This is accounted for, to some extent, by the fact that there has been a scarcity of coppers during the last two years. Tradesmen are eager for them, and banks will take any quantity. It is interesting to note that last year 17,456,963 pennies, weighing 155 tons 17 cwt. 1 qr. 7 lbs., and worth £72,737 6s. 11d., were collected from Manchester's 56,368 automatic gas-meters. Manchester, which is one of the largest users of automatic meters outside London, has often, it may be stated, on the authority of Mr. Price, £5000 locked up in the winter as a month's aggregation of pennies.

## GAS COMPANIES AND PROFIT-SHARING.

The following article, dealing with the subject of profit sharing in gas companies, in connection with the recent extensions of the system, appeared in the "Joint Stock Companies' Journal" last Wednesday.

There is much that is admirable about the later developments of the gas industry; but there is nothing more striking, or, we may add, more creditable, than the way in which it has led, and still leads, employers of labour and working men in the way of unity and concord. The gratifying testimony which is borne by the South Metropolitan and South Suburban Companies to the success attending the admission of the employees into partnership with the employers, is, we may justly surmise, dearer to the heart of Sir George Livesey than anything else in his successful life; for it was he, the unbending resister of the oppression of a Trade Union movement years ago, who created the profit-sharing system, now better called "co-partnership," which has made for recognition of the solidarity of the interests of those who, some by their capital and others by their labour, together make the companies we have named all that they are. And the system is expanding; for a third Metropolitan Company and two in the Provinces have announced that they too have reached the stage of their development at which it is possible to frame schemes of co-partnership. The Tottenham and Edmonton Gas Company is one of the most actively progressive undertakings of its kind in the kingdom; and the admission of its workmen into partnership means a great deal to them, as it will undoubtedly be highly valuable to the proprietors and to the gas-consuming public. The Bournemouth Gas and Water Company have made a similar announcement; and at their half-yearly meeting on Friday the Directors will submit a draft scheme which, they say, it is hoped will stimulate zeal and aid thrift among the servants of the Company. From Tunbridge Wells also comes the same hopeful announcement. It is a well-founded hope, as experience proves. The South Metropolitan employees have over £350,000 invested in the Company's securities, and they are directly represented on the Board by men chosen from their own ranks. The South Suburban staff, about 550 in number, have over £30,000 invested in the Company—an average of nearly £60 per man—and they also have their nominees on the Board.

It is impossible to imagine anything more excellent from the men's point of view, anything more protective from the Company's. It is the truest kind of Socialism, because it does not make for the extermination of the capitalist. Its effect is the creation of capitalists, if by that word we mean (as we surely should) people who have something in hand more than their weekly or monthly or quarterly earnings. Put baldly, the preachings of some people amount to this—that the man who works with his hands is a worker, that a man who receives dividends is a capitalist, and that the latter lives, wholly or in part, on the former, and is therefore a parasite. That is a matter which we do not discuss. There is truth in it, and misguidance. But the present point is that, when the workers can, without injustice to anyone, be given a share in the profits of the business of which they (not individually) are an essential part, the line of demarcation is rubbed out.

In the scheme of the Tottenham Company, as in those of the other two London Companies we have mentioned, it is not a question of mere bonus. The men will receive what may be called a "bonus," but it is of the nature of contingent pay, dependent, not upon the periodical votes of shareholders, not upon profits secured by the Company, but upon a sliding-scale governed by the price of gas, which is a thing which the men themselves can influence by the earnestness of their work and their zealous avoidance of anything that is wasteful of time or material. The basis of the scheme is that, starting with a standard price of 3s. per 1000 cubic feet, the men become entitled to an addition of ¾ per cent. to salaries and wages for every penny by which the price is brought below the standard. As the price is now 2s. 6d., the rate of addition is 4½ per cent. at once; and by ante-dating the arrangement to the extent of three years, the Directors are able to make a good start with a bonus of £4038, which will be invested in the Company's stock, and when the sum belonging to any man reaches £5 it is registered in his own name. It is not intended that all future payments must needs be invested in this way. There is such an obligation as to half; but the balance is at the free disposal of the recipients.

Perhaps, at first, they will not appreciate the advantages of an investment with the Company straightway, although the ante-dating of the plan gives the men an object-lesson which, we trust, will not be wasted. What is quite certain is that the best men—those who are imbued with the spirit of self-reliance and provident regard for the future—will not fail to realize the hopes of the Board and the shareholders. They will attach themselves to the Company as proprietors by strong bonds; they will stand by it, because it is standing by them. Those who, through pressure of domestic circumstances, through temperamental inability to save, draw what they can, are also protected in a measure against themselves or against the real calamity of non-saving; and even the thriftless, too, will learn to value their connection with the Company in which, willy-nilly, they are becoming shareholders. For it is an important consideration that this is not a means of making good inadequacy of wages rates. Nowadays there is remarkably little agitation and discontent among gas workers. It is a good, sound, businesslike way of putting an end to a possible source of discontent—viz., the feeling that all the benefits of hard and conscientious work, as opposed to work which will pass muster with the foreman, go to the shareholders. The men are not to be distinct from the proprietors. They are to be of them; and that is sheer gain. We wait hopefully for the next move. The inauguration of a scheme of this kind is not a thing to be undertaken lightly; but Mr. Corbet Woodall, who is Chairman of the Tottenham Company, is Governor of the Gaslight and Coke Company.

## ELECTRICITY SUPPLY AT KINGSTON-ON-THAMES.

### A Deficit of £10,739.

At Kingston-on-Thames on Tuesday last, an inquiry was held on behalf of the Local Government Board, by Mr. H. Shelford Bidwell, M.Inst.C.E., in regard to an application made by the Corporation for a further loan of £12,600 for the electricity supply undertaking.

It was stated by the Town Clerk (Mr. H. A. Winser) that the total capital outlay up to the 31st of March last was £100,343, and the deficit for last year was £884. The undertaking was established in 1894, and the total deficit was now £10,739. He did not regard this as a loss [a remark which excited laughter from opposing ratepayers] as the town had enjoyed the advantage of a sanitary light, the main streets were much better lighted than they otherwise would have been, the existence of the works had certainly had the effect of keeping down the price of gas, and the ratepayers had a valuable asset in the undertaking. A ratepayer in attendance remarked that it was clear that the present generation could not hope to get any relief from the burden which the electric light undertaking imposed on the rates.

The Inspector asked the Electrical Engineer (Mr. J. E. Edgcome) if he anticipated that the time would come when he would really turn the corner. Mr. Edgcome replied that the present loss was primarily due to the enormous increase in the price of coal; and in reply to an inquiry as to whether there were any other reasons, he mentioned various reductions which had been made in the charges for current. The Inspector asked if these reductions were justified. The Town Clerk said the number of consumers for power and heating had increased from 66 to 104 in a year. The Inspector recognized that there were more consumers; but he asked whether the undertaking was paying. Mr. Edgcome replied that with coal at the price of last year the charges were not remunerative; at present they just paid outgoings. In the course of the inquiry, Mr. Edgcome stated that there were 100 electric incandescent lamps installed in the streets, and the present application included provision for an additional 200. He added that the annual cost of the incandescent gas-lamps was £3 8s. 6d., including painting, and the Council credited the undertaking with a similar sum for each incandescent electric lamp. This price he considered covered the cost, as it worked out at about 2d. per unit. For the arc lamps £20 each per annum was charged.

At the conclusion of a prolonged inquiry, the Inspector visited the works.

**Lessons to Children in Cooking by Gas.**—It is reported that, with a view to teaching children how economical it is to cook by gas, it is proposed to instal penny-in-the-slot gas-meters at the housewifery centres controlled by the Education Committee of the London County Council.

## EXTENSIONS AT THE QUEBEC GAS-WORKS.

In a paragraph referring to the progress of the Quebec Gas Company which appeared in the last number of the "JOURNAL" (p. 477), it was mentioned that considerable extensions of the works had lately been carried out under the supervision of the Manager (Mr. R. A. Wallace). The following particulars of the new plant are taken from the "Gas Journal of Canada."

The general scheme of reconstruction was carried out with the idea that a large increase in the quantity of gas sold would necessitate plant in all departments of much greater capacity than that provided in the old works. That this idea was a correct one is evidenced by the very large increase in output since the extensions and improvements were first considered. The plant as now installed will be able to cope with a large increase in the output, and give customers an ample supply of gas of good quality, which can be made at the minimum of cost.

The plan of the works prevents the handling of coal to the best advantage; but, after carefully considering all possible methods, it was decided to adopt a system of railways in the principal coal-sheds, with tracks to various parts of the sheds. This system deals with coal up to the new breaker, elevator, and hopper, which are placed at the end of the retort-house nearest the large coal-sheds. The breaker and elevator have a capacity of 16 tons of coal per hour; and the Company are thus able to handle the raw material as fast as it can be delivered by the cars of the railway system. It is now possible to store sufficient coal overhead in the retort-house, in the hopper, to last during the night shift, so that no work need be done outside during the hours of darkness. This is of very great material advantage.

The new benches, eight in number, with six retorts in each (set in two lines of four, back to back), are of the most modern type, with three-quarter regenerative furnace settings, whereby the amount of fuel required to keep the benches at a proper temperature is reduced to a minimum. The capacity of the eight benches, using Nova Scotia coal, is approximately 320,000 cubic feet per 24 hours. With American coal, the capacity would be increased to 400,000 cubic feet. The adoption of this type of bench necessitated the erection of a stage-floor, which has been installed of rolled steel joists and rolled steel checker plates, with two stairways leading to the lower floor. The iron fittings for the benches are all of the most improved type, including self-sealing mouthpieces, and the hydraulic main sections each having two cleaning-pockets. The Biggs-Wall system of manual charging of the retorts was adopted as an improvement on the old shovel method. At the time the description was written, the system was not in use; but it was expected that when the stokers were properly instructed in its use, and the necessary auxiliary appliances were provided, it would work to the utmost satisfaction, as it lightened the labour of the men, distributed the coal more evenly over the inner surface of the retorts, and enabled better carbonizing results to be obtained than with the ordinary method of hand charging.

The new bench was erected in a building which was used as a retort-house many years ago; and it was necessary to raise the walls, owing to the increased height of the new stack. To ensure absolute immunity from danger of fire, it was necessary to replace the old roof, of wooden construction, by a steel trussed one, covered with galvanized corrugated iron. This work has been carried out; and the retort-house is complete and up to date in every respect.

The new condensing plant consists of two multitubular water-cooled condensers, each 5 feet diameter and 19 feet high, with 170 2½-inch lap-welded iron tubes; the two having a capacity of 800,000 cubic feet per 24 hours. In addition to these, the six old ones, of the atmospheric type, have been overhauled, repaired, and re-erected; thus materially increasing the efficiency and capacity of the condensing plant.

The proper scrubbing and washing of gas made from Nova Scotia coal is one of the most important features of the process of manufacture, as if this is not properly done a great deal of extra work is thrown upon the purifiers, where the cost of removing the impurities from the gas is much greater than in the scrubbing and washing plant. One of Walker's combined scrubber-washers of the vertical type, with a capacity of 800,000 cubic feet per 24 hours, has been installed, with a driving-engine and all fittings; and it is stated to be proving very satisfactory. The new exhausting plant consists of two of Beale's rotary exhausters and engines, connected direct, each having a rated capacity of 600,000 cubic feet per 24 hours.

The very high percentage of sulphur in Nova Scotia coal makes it a difficult and intricate problem to eliminate the sulphur compounds from the gas unless the purifying plant is of large capacity. It was therefore considered necessary to instal four new purifiers, each 20 feet square and 5 feet deep, with the latest valve arrangements and cover-fasteners. These have been erected, and are now in successful operation. Since the new condensing and scrubbing plant and the new purifiers have been in use, the gas passing the outlet of the last box has been free from sulphuretted hydrogen, and well within the limits set by the Government for other impurities. An efficient elevator to convey the oxide and lime from the ground to the upper floor has also been installed.

Two new station meters, of the rotary type, have been installed—one with a capacity of 720,000 cubic feet per 24 hours, for use in the coal gas department; and the other of 360,000 cubic feet daily capacity, to measure the make of the carburetted water-gas plant. The steam-raising plant consists of two horizontal tubular boilers, each of 100-H.P., capable of working at a pressure of 100 lbs. per square inch. This installation will make a great improvement in the conditions round the plant, particularly during the winter months, when so much steam is required for heating purposes.

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**Wandsworth and Putney Gas Company.**—At the half-yearly meeting of the Company to-day, the accounts to be presented show a profit of £11,645, and £18,640 available for distribution. The Directors will recommend dividends at the statutory rates of £8, £6 10s., and £5 12s. per cent. per annum on the three classes of stock.

## TORQUAY CORPORATION WATER SUPPLY.

### Further Capital Outlay on Works Foreshadowed.

The members of the Torquay Town Council recently paid their annual visit of inspection to the water-works at Tottiford, on the border of Dartmoor. Special interest attached on this occasion to the new Trenchford reservoir, which was opened last September. The reservoir has a storage capacity of 200 million gallons, and was constructed at a cost of £52,000. At the dinner which followed the inspection, the Deputy-Mayor (Mr. J. Smerdon) said the town possessed in the water undertaking property worth £400,000—an asset which was equal to the whole municipal debt. The Water Committee still had before them work of great importance in the laying of another main to the town; and with this they might consider the question of obtaining new customers. Mr. F. J. Crocker, the Chairman of the Water Committee, said the new reservoir had proved in every way satisfactory. It was full of water, and no leakage or depression of any sort had shown itself. No water from it would be used until next year, when they believed the quality and supply would be admirable. Though the cost of the scheme had been heavy, it had not been more than was necessary to ensure the reliability of the work. The financial position of the undertaking was better than it had been for several years; and if the Local Government Board allowed a transfer which had been made from revenue to capital, they would have a substantial credit balance. The ordinary increase in revenue would, he thought, meet the outlay which would be necessary for the laying of a new pipe-line. Since the initiation of the works fifty years ago, not a year had passed in which the hands of the governing body had not been forced to provide for an increased supply of water. The storage question was now settled for at least a generation; but that of the length of time the provision of a new main could be put off must be to all of them a matter of some anxiety. Owing to the almost criminal waste of water, the present mains were taxed to their utmost capacity. Mr. S. C. Chapman, the Water Engineer, referring to the necessity for a new main, said the present consumption was about 2 million gallons a day, and the mains were working at their full capacity. Not another gallon of water could be got home; but people did not seem to realize that the waste for which they were responsible was hastening the day when the heavy capital expenditure on a new main would have to be incurred. It was a matter of concern to the consumers, for it might mean an increase in the water-rate.

## CARDIFF CORPORATION WATER SUPPLY.

### The Proposed Additional Reservoir.

A Special Meeting of the Water Committee of the Cardiff Corporation was held on Monday last week, to consider the resolution passed by the Council at the meeting held the previous Thursday (see *ante*, p. 471), and to discuss the suggestions put forward as an alternative to the Committee's scheme for the construction of No. 3 reservoir at Taff Fawr, at an estimated cost of £235,000.

The Chairman (Alderman Robert Hughes) said that since 1882 the Council had been committed to the scheme which it was proposed to carry out, and which was suggested by the late Mr. J. F. Bateman. Several members of the Council at the recent meeting made various suggestions as to what the Council should do—ignoring absolutely the fact that the Committee had acquired land for the purpose of constructing the proposed reservoir. Among the suggestions made was that they should consider the advisability of getting a supply of water from the Severn Tunnel. Mr. Nicholl, who made the suggestion, had admitted later on in the discussion that the Great Western Railway Company could not give them any guarantee as to the quantity of water they could supply. What would the suggestion mean? So far as they knew at present, the Railway Company had offered this water to a neighbouring town for 1½d. per 1000 gallons. Cardiff wanted 3 million gallons a day, which for twelve months would amount to £6843 15s. To soften this water would cost about £1156 a year; bringing up the total to £8000 per annum. Capitalized at 25 years' purchase, this would mean £200,000. The construction of a reservoir at Cardiff at a height which would be absolutely necessary would cost at least £110,000, and the mains would cost another £66,000; making a total of £376,000. This would be without their possessing the water themselves; while the water would not be anything like so good as that which they got from their own watershed. In order not to lose time, he asked Mr. Priestley, their Water-Works Engineer, to write to the Railway Company; and his letter included the following queries: (1) If the Company would be prepared to give a continuous supply of 2 to 3 million gallons of water per day, delivered at some point near the city boundaries. (2) The price per 1000 gallons of the raw water as pumped. (3) If it was possible to treat the water to reduce the hardness to at least 5° or 6°, and what would be the extra cost of so treating it. (4) Would the Company be prepared to supply the raw water to Cardiff into a storage reservoir to be constructed near the city, such reservoir to have a capacity of 1 million gallons? (5) Would the Company be prepared to pump the water into the mains at the Severn Tunnel, such mains to be along the Company's track, and laid at the expense of the Corporation? (6) Was it a fact that any of the water pumped was supplied for domestic purposes to the villages or farms near the tunnel? (7) Had the Severn Tunnel water been softened for any purpose, and how far was it possible to soften the water?

After some discussion, the following resolution was carried unanimously: "That, after considering the various suggestions made at the Council meeting, this Committee are of opinion that the time has arrived when we consider it necessary to apply to Parliament for powers to raise the embankments of the present reservoirs, and also for sanction to borrow the money for constructing No. 3 reservoir and to purchase additional land, and, further, to amend certain of the Water Acts agreements."

## NOTES FROM SCOTLAND.

**From Our Own Correspondent.** *Saturday.*

I have received from Mr. George Braidwood, the Hon. Secretary and Treasurer of the Scottish Junior Gas Association (Western District), a copy of the "Transactions" of the fourth session of the Association. It is a goodly volume of 71 pages, and contains, besides an account of the business transacted at the meetings and visits of the Association during the session, the annual report of the Council, lists of office-bearers and members, and the balance-sheet. There is also an index to the contents. In the report of the Council, it is stated that the total number of members on the roll at the end of the fourth session was 117—consisting of 100 ordinary and 17 honorary members. During the session, six monthly meetings were held, at which papers were read and discussed. As arranged at the previous annual general meeting, a medal was offered to the reader of the paper which should be considered best by a Committee of three honorary members; and the medal was won by Mr. R. A. Campbell, of Glasgow, on "Laying-Out Gas-Works." At all the meetings the attendance of members was large. Five visits to works took place, all of which were largely attended, and proved to be a pleasant means of acquiring knowledge, as well as promoting good fellowship among the members. The Council desired to express their indebtedness to the Companies and Corporations who threw open their works for inspection, and in other ways contributed to their instruction and entertainment, and to the Governors of the Glasgow and West of Scotland Technical College for their kindness in granting to the members the use of the College for the holding of their meetings, and for placing the Library at their disposal.

The gas accounts of the Perth Corporation for the past year were considered by the Town Council on Monday. Councillor Hamilton, the Convener of the Gas Committee, in submitting them, said that the year had been as prosperous as any of its predecessors, and in several respects even more so. A serious increase in the cost of coal, and the consequent increase of 3d. in the price of gas, had to some extent checked the rate of growth of the department. The revenue from gas was £31,756, *plus* £317 for unbooked gas. The total ordinary revenue amounted to £40,964, and the expenditure to £26,190; leaving a balance of £14,774, which, after being applied in the usual way, brought out a profit of £194 on the year's working. The accounts were adopted. In submitting the estimates for the current year, Mr. Hamilton said the Gas Committee felt justified in recommending that the price of gas be reduced by 1d. per 1000 cubic feet; making it, for ordinary consumers, 2s. 11d. in the city, 3s. 4d. in Scone, and 3s. 5d. in Tulloch, with the usual discounts; for prepayment meter consumers, 3s. 4d., 3s. 9d., and 3s. 10d. respectively; and for manufacturing purposes, 2s. 7d. in all districts, subject to the usual conditions. For power purposes, a special new scale of charges had been drawn up, giving a range in price from 2s. 6d. per 1000 cubic feet for the first 100,000 cubic feet consumed, down to 1s. per 1000 for the tenth 100,000 cubic feet consumed. This scale, the Committee believed, would act as an incentive to the extended use of gas for power purposes by small and large consumers alike. A new departure was proposed in connection with stove rents. Hitherto the rents of stoves had been the same from year to year, but the Committee now proposed to reduce the rents of cooking-stoves by 1s. 2d. in cases where the stoves had been in use for twelve months, making the rents from 1s. for smaller articles to 4s. for the larger sizes of cookers. An extra margin had been allowed for in the repairs and works account, and on the inspection and repair of meters. A small saving was anticipated in repairs and maintenance of mains and service pipes, and in repair of stoves. The total expenditure was estimated at £26,452—an increase of £433. On the revenue side of the account, they estimated an income of £30,411 from the sale of gas, a decrease of £1345; and from residual products, an income of £7910, a decrease of £441. The total revenue was estimated at £38,623, a decrease of £2006; and after meeting payments of annuities, interest, sinking fund, and other charges, it was estimated that there would be a balance of £140 at the end of the year. Bailie Macpherson moved that the prices of gas remain the same as last year; but he failed to find a seconder, and the Committee's recommendations were adopted.

The Dundee Gas Committee are feeling anxiety regarding a circular issued by the Railway Companies, intimating their intention to charge for demurrage in respect of the detention of traders' waggons. At a meeting of the Committee on Tuesday, the Engineer (Mr. A. Yuill) expressed the view that the railway policy would in all probability be serious for all users of railway waggons. He considered it advisable that a Sub-Committee be appointed to watch over their interests, and to co-operate with other bodies in any action which might be deemed expedient. The Gas Committee agreed to this, and appointed a Sub-Committee.

Another case of complaint from smells has arisen—this time in Dundee, where the residents in the West End are in strong agitation regarding the effluvia which is exhaled from the foreshore, which is, and has been for many years, under reclamation by the deposit of refuse. Among the refuse deposited there is that from the gas-works; and some do not hesitate to say that it is the cause of the very disagreeable smell. One gentleman has analyzed liquid which has been collected at the place, and announces that he has found it to contain, in 100,000 parts, 40 parts of caustic soda, 0·2 part of free ammonia, nearly 1 per cent. of sulphuretted hydrogen gas, and evidently sulphur in solution, as, on exposure to light and air, sulphur is precipitated. This gentleman asserts that two years ago he gave it as his opinion that the smell was due to waste lime from the purification of coal gas, which had been tipped at a remote part of the beach; but he was told by the man in charge that gas lime had never been laid down in this particular district. About the same time, he goes on to state, another party told him that, some months before, 100 dozen rotten eggs were buried in line with the supposed underground flow of the water; but he considers that surely, after two years, even those would have lost their pungency. The Public Health Committee have bestowed their consideration upon the matter, and consulted, among others, Mr. A. Yuill, the Gas Engineer. They had the subject before them yesterday, when Mr. High, the Convener, explained that, in his view, the highly offensive odour was not due to sewage, but that, in addition to the natural odour of river mud, there was a highly objectionable smell coming from deposits of gas lime and vegetable matter. The Committee resolved that all deposits from the Cleaning Department be stopped, as well as deposits of spent lime from the gas-works. A requisition to the Procurator Fiscal, supported by 380 residents, has been sent in, asking him to take action in the matter under the Public Health (Scotland) Act, 1897.

At the Huntly Town Council meeting on Monday, application was

## GAS COMPANIES' STOCK AND SHARE LIST.

**Referred to on p. 504.**

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p.c. | | | | £ s. d. |
| 500,000 | £10 | Apl 10 | 10 | Alliance & Dublin 10 p.c. | 19–20 | .. | 5 0 0 |
| 268,324 | £10 | | 7 | Do. 7 p.c. | 13–14 | .. | 5 0 0 |
| 310,000 | Stk. | July 15 | 4 | Do. 4 p.c. Deb. | 99–102 | .. | 3 18 5 |
| 200,000 | £5 | May 29 | 6½ | Bombay, Ltd. | 6–6¼ | .. | 5 0 0 |
| 40,000 | £5 | | 6½ | Do. New, £4 paid | 4¼–4¾ | .. | 5 9 6 |
| 50,000 | £10 | Feb. 27 | 14 | Bourne-mouth Gas & Water } 10 p.c. | 28½–29½ | .. | 4 14 11 |
| 51,810 | £10 | ,, | 7 | B 7 p.c. | 16½–16¾ | .. | 4 3 7 |
| 53,200 | £10 | .. | 6 | Pref. 6 p.c. | 15–16 | .. | 3 15 0 |
| 380,000 | Stk. | Aug. 13 | 12½ | Brentford Consolidated | 243–247* | +4 | 5 1 3 |
| 300,000 | ,, | ,, | 9½ | Do. New | 180–185* | +2 | 5 2 8 |
| 50,000 | ,, | .. | 5 | Do. 5 p.c. Pref. | 120–125* | +3 | 4 0 0 |
| 206,250 | ,, | June 12 | 4 | Do. 4 p.c. Deb. | 100–103 | .. | 3 16 2 |
| 220,000 | Stk. | Mch. 12 | 10¾† | Brighton & Hove Orig. | 210–215 | .. | 5 0 0 |
| 246,320 | ,, | .. | 7¼† | Do. A. Ord. Stk. | 154–159 | .. | 4 17 6 |
| 460,000 | £20 | Mch. 27 | 10 | British | 41–43 | .. | 4 13 0 |
| 109,000 | Stk. | Feb. 13 | 6 | Bromley, Ord. 5 p.c. | 116–119 | .. | 5 0 10 |
| 165,700 | ,, | .. | 4½ | Do. do. 3½ p.c. | 86–89 | .. | 5 1 2 |
| 500,000 | £10 | May 14 | 7 | Buenos Ayres (New) Ltd. | 11–11½ | .. | 6 1 9 |
| 250,000 | Stk. | June 26 | 4 | Do. 4 p.c. Deb. | 91–93 | .. | 4 6 0 |
| 150,000 | £20 | July 15 | 7½ | Cagliari, Ltd. | 24–25 | .. | 5 16 0 |
| 100,000 | £10 | — | — | Cape Town & Dis., Ltd. | 4–6 | .. | — |
| 100,000 | £10 | Apl. 26 | 4½ | Do. 4½ p.c Pref. | 5–7 | .. | 6 8 7 |
| 50,000 | £50 | May 2 | 6 | Do. 6 p.c. 1st Mort. | 48–50 | .. | 6 0 0 |
| 100,000 | Stk. | June 26 | 4½ | Do. 4½ p.c. Deb. Stk. | 78–83 | .. | 5 8 5 |
| 157,150 | Stk. | Aug. 13 | 5 | Chester 5 p.c. Ord. | 103½–104½* | .. | 4 12 7 |
| 1,493,280 | Stk. | Mch. 12 | 5⅝ | Commercial 4 p.c Stk. | 107–112 | +1 | 4 12 10 |
| 560,000 | ,, | , | 5 | Do. 3½ p.c. do. | 102–107 | +1 | 4 13 6 |
| 475,000 | ,, | June 26 | 3 | Do. 3 p.c. Deb. Stk. | 81–83 | .. | 3 12 3 |
| 800,000 | Stk. | June 12 | 5½ | Continental Union, Ltd. | 110–115 | .. | 5 13 1 |
| 200,000 | ,, | ,, | 7 | Do. 7 p.c. Pref. | 136–141 | .. | 4 19 3 |
| 460,170 | Stk. | — | 5 | Derby Con. Stk. | 122–124 | +1 | 4 0 8 |
| 55,000 | ,, | — | 4 | Do. Deb. Stk. | 103–105 | .. | 3 16 2 |
| 148,995 | ,, | Mch. 31 | 5 | East Hull 5 p.c. Ord. | 100–103 | .. | 4 17 1 |
| 486,090 | £10 | July 15 | 12 | European, Ltd. | 22½–23½ | .. | 5 2 2 |
| 354,060 | £10 | , | 12 | Do. £7 10s. paid | 16½–17½ | .. | 5 2 10 |
| 15,182,590 | Stk. | Aug. 13 | 4/1c/8 | Gas-light and Coke } 4 p.c. Ord. | 97–99* | .. | 4 11 7 |
| 2,600,000 | ,, | ,, | 3⅜ | 3⅜ p.c. max. | 86–89* | .. | 3 18 8 |
| 3,799,735 | ,, | ,, | 4 | 4 p.c. Con. Pref. | 104–107* | .. | 3 14 9 |
| 4,193,975 | ,, | June 12 | 3 | 3 p.c. Con. Deb. | 84–86 | +1 | 3 9 9 |
| 258,740 | Stk. | Mch. 12 | 5 | Hastings & St. L. 3½ p.c. | 93–95 | .. | 5 2 0 |
| 82,500 | ,, | ,, | 6½ | Do. do. 5 p.c. | 112–115 | .. | 5 13 1 |
| 70,000 | £10 | Apl. 29 | 11 | Hongkong & China, Ltd. | 18–19 | .. | 5 15 9 |
| 4,940,000 | Stk. | May 14 | 8 | Imperial Continental | 180–182 | .. | 4 7 11 |
| 473,600 | Stk. | Aug. 13 | 3½ | Do. 3½ p.c. Deb. Red. | 94–96* | .. | 3 12 11 |
| 195,242 | Stk. | Mch. 12 | 6 | Lea Bridge Ord. 5 p.c. | 115–122 | +4½ | 4 18 4 |
| £ | | | p.c. | | | | £ s. d. |
| 561,000 | Stk. | Feb. 27 | 10 | Liverpool United A | 232–234 | .. | 4 5 6 |
| 718,100 | ,, | ,, | 7 | Do. B | 166–168 | .. | 4 3 4 |
| 306,083 | ,, | June 26 | | Do. Deb. Stk. | 104–106 | .. | 3 15 6 |
| 75,000 | £5 | June 26 | 6 | Malta & Medn., Ltd. | 4¼–4⅝ | .. | 6 6 4 |
| 560,000 | £100 | Apl. 1 | 5 | Met. of } 5 p.c. Deb. | 101–103 | .. | 4 17 1 |
| 250,000 | £100 | | 4½ | Melbourne } 4½ p.c. Deb. | 101–103 | .. | 4 7 5 |
| 541,920 | £20 | May 29 | 3¾ | Monte Video, Ltd. | 11–12 | .. | 5 16 8 |
| 1,775,892 | Stk. | July 30 | 4/12/6 | Newc'tle & G'tesh'd Con. | 107–.08 | −½ | 4 5 8 |
| 418,460 | Stk. | June 26 | 3½ | Do. 3½ p.c. Deb. | 90–92 | .. | 3 16 1 |
| 15,000 | £10 | Feb. 27 | 10 | North Middlesex 10 p.c. | 20–21 | .. | 4 15 3 |
| 55,940 | £10 | ,, | 7 | Do. 7 p.c. | 13½–14½ | .. | 4 16 7 |
| 300,000 | Stk. | Apl. 29 | 8 | Oriental, Ltd. | 140–143 | .. | 5 11 11 |
| 60,000 | £5 | Mch. 27 | 7 | Ottoman, Ltd. | 6–6½ | .. | 5 7 8 |
| 398,490 | £5 | Apl. 29 | 7 | Primitiva Ord. | 5⅞–6⅛ | −⅛ | 5 12 0 |
| 796,980 | £5 | July 30 | 5 | Do. 5 p.c. Pref. | 4⅞–5⅛ | .. | 4 17 7 |
| 488,900 | £100 | June 1 | 4 | Do. 4 p.c. Deb. | 95–97 | +2 | 4 2 6 |
| 1,000,000 | £10 | Apl. 29 | 8 | River Plate Ord. | 13¼–13⅝ | .. | 5 16 5 |
| 312,650 | Stk. | June 26 | 4 | Do. 4 p.c. Deb. | 92–94 | .. | 4 5 1 |
| 250,000 | £10 | Apl. 10 | 8 | San Paulo, Ltd. | 13½–14 | .. | 5 14 4 |
| 125,000 | £50 | July 1 | 5 | Do. 5 p.c. Deb. | 49–51 | .. | 4 18 0 |
| 135,000 | Stk. | Mch. 12 | 10 | Sheffield A | 245–246 | .. | 4 1 4 |
| 209,984 | ,, | ,, | 10 | Do. B | 244–246 | .. | 4 1 4 |
| 523,500 | ,, | ,, | 10 | Do. C | 244–246 | .. | 4 1 4 |
| 70,000 | £10 | May 29 | 10 | South African | 13–14 | .. | 7 2 10 |
| 6,429,895 | Stk. | Aug. 13 | 16/8 | South Met., 4 p.c. Ord. | 118–121* | .. | 4 8 1 |
| 1,895,445 | ,, | July 15 | 3 | Do. 3 p.c. Deb. | 83–85 | .. | 3 10 7 |
| 209 830 | Stk | Mch. 12 | 8 | South Shields Con. Stk. | 156–158 | +1 | 5 1 3 |
| 605,000 | Stk. | Aug. 13 | 5/6/8 | S'th Suburb'n Ord. 5 p.c. | 113–116* | .. | 4 9 7 |
| 60,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. | 117–122* | .. | 4 2 0 |
| 117,058 | ,, | July 15 | 5 | Do. 5 p.c. Deb. Stk. | 120–125 | .. | 4 0 0 |
| 502,310 | Stk. | May 14 | 5 | Southampton Ord. | 108–113 | .. | 4 8 6 |
| 120,000 | Stk. | Aug. 13 | 6¾ | Tottenham } A 5 p.c. | 117–122* | .. | 5 10 8 |
| 398,940 | ,, | , | 5¼ | and } B 3½ p.c. | 105–108* | .. | 4 17 3 |
| 149,470 | ,, | June 26 | 4 | Edmonton } 4 p.c. Deb. | 100–105 | +2 | 3 16 2 |
| 182,380 | £10 | June 12 | 8 | Tuscan, Ltd. | 10–.0¾ | .. | 7 12 4 |
| 149,900 | £10 | July 1 | 5 | Do. 5 p.c. Deb. Red. | 99–101 | .. | 4 19 0 |
| 193,742 | Stk. | Feb. 27 | 5 | Tynemouth 5 p.c. max. | 106–107 | .. | 4 13 6 |
| 255,636 | Stk. | Feb. 13 | 6½ | Wandsworth } B 3½ p.c. | 128–133 | .. | 4 17 9 |
| 79,416 | ,, | June 26 | 3 | and } 3 p.c. Deb. Stk. | 73–78 | +1 | 3 16 11 |
| 845,872 | ,, | Feb. 27 | 5½ | Putney | | | |
| 185,000 | ,, | ,, | 5 | West Ham 5 p.c. Ord. | 101–104 | .. | 4 18 6 |
| 228,300 | ,, | June 26 | 4 | Do. 5 p.c. Pref. | 120–125 | .. | 4 0 0 |
| | | | | Do. 4 p.c. Deb. Stk. | 100–105 | .. | 3 16 2 |

Prices marked * are "Ex div." † Next dividend will be at this rate.

made by the Gas Company for leave to open several streets for the purpose of laying new pipes. The Streets Committee had agreed that permission be given for the opening of some of the streets, but that, with regard to the others, the application should be declined, as the thoroughfares had recently been made up by the Council. Provost Rhind expressed himself as in favour of allowing the Company to open up any of the streets—putting the burden upon them of leaving the streets in the condition in which they found them. The pipes in many cases were in a defective state; and it might be a case of guarding the public health. The Council adopted the recommendation of the Committee.

The thoroughfares in the village of Strichen, in Aberdeenshire, are at present lighted by 27 gas-lamps, with flat-flame burners. The lighting is considered to be unsatisfactory; and the proposal has been made to convert the burners into incandescent ones. This has given an opportunity to the promoters of electric lighting, who are to be found everywhere, even in small villages. They have obtained the ear of a local Committee, who are of opinion that, before agreeing to the conversion of the lamps, the matter should be laid before the ratepayers. In the belief of the Committee, Strichen is so distant from the coalfield, and the Gas Company have so few customers, that the Company can never be expected to supply gas at a low rate. The cost of lighting the streets last season was £42. An estimate, which is described as a rough one, has been issued by the Committee, in which they submit that an oil-engine and dynamos, to supply 30 lamps of 30-candle power each, with overhead wires, could be obtained for £250, the annual charge for which would be £10. The annual cost to the community for electric lighting, they estimate, would be £20—which would be a saving of £22. The Committee forget to make provision for the repayment of the £250, to repay which in twenty years would cost £12 10s. a year; and also depreciation, which, at even 5 per cent., would cost another £12 10s.—together £25. So that, it is plain, on these two points alone, lighting by electricity would cost £3 a year more than gas.

In presenting the annual accounts in the Police Department to the Glasgow Town Council on Thursday, Treasurer D. M. Stevenson said he stated last year that they were paying off debt at the rate of £1000 per day; and this year they were paying it off at the rate of £1060 per day. He went on to remark that it was quite obvious that paying off debt by sinking fund of the industrial enterprises meant that they were really laying aside a large reserve. Every penny the Tramway Department put aside, and every penny the Gas and Electricity Departments put aside in the way of sinking fund, was simply a reserve; it was actual money, and belonged to the undertakings, which were maintained in a thorough state of efficiency out of the revenue besides the writing off of ample depreciation. The citizens had at present over five millions sterling in the form of sinking funds at their credit, most of the money belonging to the industrial enterprises. The whole point of his remarks, he said, was that if the conservative policy which had been in favour for some time were persisted in, they would soon see a substantial reduction in the rates. If those friends who clamoured for bridges and great extensions of the water-works would simply make sure that they did not spend money unless it was absolutely necessary, they would see the reduction in the rates before very long. This latter remark brought to his feet Mr. Edward Watson, who said that the Water Committee had taken the first practical step to increase the water supply of the city, by beginning work at Loch Arklet. Treasurer Stevenson had practically suggested that they should stop the work at Loch Arklet, and try to economize by not entering upon the new capital expenditure; but the Treasurer was just about twenty years behind the times in making this recommendation. They had paid not only the parliamentary cost of obtaining power, but also about £3000; and if they ceased to go on with the work now in hand, they would drop all the initial cost, including the sum of £3000. He pointed out that the Treasurer was one of the strongest advocates of the higher, lying districts in the city having a direct water supply from the mains—and that, following this advice, the Corporation had agreed to proceed with the laying of one or more mains, which would cost about £100,000 each. Treasurer Stevenson, in reply, questioned if there were any necessity for going on with the Loch Arklet scheme in the meantime, as he believed they had an ample water supply for many years; and the Water Committee could get the period extended within which they could exercise their powers. The accounts were adopted.

## Municipal Trading at Acton.

According to the statement of the accounts of the Acton Urban District Council which was published on Monday last week, the mortgage debt on the district (including education loans) on March 31 last was £513,602, or a debt of £9 10s. 8d. per head of the population, and £1 7s. 8d. per pound of the rateable value. Owing to the increased number of empty properties, the general district rate produced £250 less than was estimated; and the net increase in the assessable value during the twelve months was only £7456, compared with an increase of £36,491 the previous year. The total new borrowings, including £20,000 for a sewage scheme and £23,050 for a refuse destructor, were £52,462. The Council have found municipal trading to be a distinct loss to the district. The sum of £33,488 has been spent upon public baths. But the income would not meet the working expenses by £966; and after providing for loan instalments and interest, the result was a net deficiency of £2973. Though there was a gross profit on the cemetery fund, there was, after debiting loan charges, an amount of £715 to be borne by the rates, compared with £658 the previous year. The electric light undertaking showed a loss; there being a deficiency for the year of £2934. The total cost to the Council of each unit, exclusive of loan charges, was 3·48d., against 3·76d. in the preceding year; and the Council are in the peculiar position that the more electricity they supply the greater will be the deficiency. This has resulted in gas being substituted for electricity in the streets. (See *ante*, p. 409.) The total debt on capital account in connection with the electric light undertaking at the end of March last was £58,011.


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## CURRENT SALES OF GAS PRODUCTS.

**Sulphate of Ammonia.** LIVERPOOL, *Aug.* 22.

Demand has been fairly well sustained, but prices have been irregular, owing to scarcity of supplies at some ports. On the whole, however, there has been a slight improvement in values. The closing quotations are £11 8s. 9d. per ton f.o.b. Hull, £11 11s. 3d. to £11 12s. 6d. per ton f.o.b. Liverpool, £11 12s. 6d. to £11 15s. per ton f.o.b. Leith. Further business is reported for delivery over the spring months at £12 2s. 6d. per ton f.o.b., and makers are now asking £12 5s. per ton, but buyers do not seem willing to pay this further advance. For October-March delivery, £12 per ton is being quoted, but without result.

**Nitrate of Soda.**

This article remains very quiet, at 10s. per cwt. for 95 per cent., and 10s. 3d. for refined quality.

**Tar Products.** LONDON, *Aug.* 24.

The markets have remained dull throughout the past week. Creosote is still firm, and London manufacturers will not consider anything under 2¾d. for prompt delivery. Business is almost impossible in benzol. In crude carbolic, small sales are reported to have been done at 1s. 3¾d. east coast; and there is very little demand for either prompt or forward delivery. As to refined naphthalene, prices are well maintained, but there is little business doing. Tar prices are unchanged.

The average values during the week were: Tar, 11s. 6d. to 15s. 6d., *ex* works. Pitch, London, 17s. 6d. to 18s.; east coast, 17s. to 17s. 6d.; west coast, 16s. to 17s., f.a.s. Benzol, 90 per cent., casks included, London, 7d.; North, 6⅞d. to 6¾d.; 50-90 per cent., casks included, London, 7d.; North, 6⅞d. Toluol, casks included, London, 7½d. to 7⅝d.; North, 7d. to 7¼d. Crude naphtha, in bulk, London, 3¼d. to 3½d.; North, 3d. to 3¼d.; solvent naphtha, casks included, London, 10d.; North, 8¾d. to 9d.; heavy naphtha, casks included, London, 9¾d. to 10¼d.; North, 8¾d. to 9¼d. Creosote, in bulk, London, 2⅝d. to 2¾d.; North, 2⅜d. to 2½d. Heavy oils, in bulk, 2⅞d. to 3d. Carbolic acid, 60 per cent., casks included, east coast, 1s. 4d.; west coast, 1s. 3½d. Naphthalene, £4 10s. to £8 10s.; salts, 35s. to 37s. 6d., packages included and f.o.b. Anthracene, "A" quality, 1½d. to 1¾d. per unit, packages included and delivered.

**Sulphate of Ammonia.**

This article is still very firm. The principal London Gas Companies quote £11 15s. to £11 17s. 6d. for September-December. Outside London makes could be secured at £11 7s. 6d. to £11 8s. 9d. In Hull, the price may be taken at £11 5s. to £11 7s. 6d.; while in Liverpool, £11 10s. has been paid for prompt delivery. In Leith, £11 12s. 6d. would be accepted.

## COAL TRADE REPORTS.

**Northern Coal Trade.**

There is a change in the Northern coal trade such as is common in the autumn—a lessened export of coal, and an increase in the home consumption. This, as it proceeds, will lessen the output of Northumbrian coals, and increase that of gas and other kinds of Durham coal. In the steam coal trade, best Northumbrians are about 15s. 3d. per ton f.o.b., which is the colliery price; while merchants quote lower figures for forward delivery. Second-class steams are from 12s. to 12s. 6d. per ton, and steam smalls vary from about 5s. 6d. to 6s. 6d. In the gas coal trade there is now a heavy export, and there is also an increased demand on the large home contracts. Prices of Durham gas coals vary from about 10s. 6d. per ton f.o.b. up to 11s. 3d. for the usual qualities; while for "Wear specials," the price quoted is now about 11s. 9d. There is more bargaining for contracts for delivery into next year, and the price is generally steady at something like the current values; but with distant delivery there is in most cases a disposition to ask for concessions from these prices. In the coke trade, the market is steady, and gas coke is still somewhat scarce. Good gas coke is quoted from 15s. 3d. to 16s. 3d. per ton f.o.b. in the Tyne; and there is a steady demand for export.

**Scotch Coal Trade.**

The improved demand continues, and prices are firm, but not advancing. Though shipping orders are the most abundant, there are signs of betterment in home consumption, for all except the very smallest sorts. The prices quoted are: Ell, 10s. 9d. to 12s. 6d. per ton f.o.b. Glasgow; splint, 10s. 9d. to 11s.; steam, 10s. to 10s. 3d. The shipments for the week amounted to 345,793 tons—an increase of 15,532 tons upon the previous week, and of 5743 tons upon the corresponding week of last year. For the year to date, the total shipments have been 8,612,859 tons—a decrease of 461,532 tons upon the same period of 1907.

**Gas Coal Prices.**

Writing on this subject last Thursday, the "Pall Mall Gazette" said: "Gas coal is firming up in a rather pronounced manner; and large gas concerns, like those of Leeds and Sheffield, which have not yet made their contract arrangements, may yet have cause to regret their delay. The market for gas fuel appeared so hopeless at the end of May that collieries hastened to dispose of the bulk of their possible output, with the result that they can only tender now at higher figures. The labour situation is not one to be lost sight of. The miners are enjoying the highest wages in their experience, and will not readily give way. Indeed, we have previously hinted that both owners and men hold the opinion that a friendly strike for a week or two, at the end of September, would be advantageous to both sides; and later information leads us to warn the public not to be very much surprised if something of the kind takes place."

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## Public Lighting Dispute at Thetford.

Owing to a dispute between the Thetford Gas Company and the Town Council, the latter have been considering the advisability of lighting the town with oil. At a recent meeting of the Council, Mr. S. Oldman said he was satisfied the Council did not consume, and never had done so, £260 worth of gas a year. In order to give the Company another chance of reconsidering their position, he would move—"That unless the Council had an assurance from the Gas Company of the latter's intention to reduce their claim of £257 6s. 6d. by Aug. 25, the Council instructs the Lighting Committee to light the town with oil for the remainder of the season of 1908 and 1909." He said they had tried for several weeks to get something definite from the Company, but had failed. He had gone into this matter closely. They had 114 lamps—53 ordinary, 53 incandescent, and 8 all-night. He estimated that these could be supplied with best oil-lamps and lighted for the season for £210 all told, against £260 charged by the Company. This was a saving of £50, after including the cost of the lamps; and they could have even better light in some parts of the town than they had at present. He was sorry the matter had come to the present pass. But it had been forced upon them; and, in the interest of the ratepayers, they had no other course to adopt. Mr. W. Fowell seconded the motion. It was, however, opposed by Mr. R. Tilley, who thought oil-lamps were useless. He moved, as an amendment, that the Council continue to light the town with gas; but it did not find a seconder. The Mayor (Mr. F. H. Millington) expressed regret that affairs had come to a deadlock, but said he thought the matter was merely one of arbitration. He moved, as a further amendment, that the account in dispute be submitted to an independent arbitrator, each party to pay half the cost; and that the Gas Company be invited to submit a tender for lighting the town with the same number of lamps as at present, except that the time of turning out be 11 instead of 11.30 p.m. On being put, this amendment was lost. The resolution was carried by 7 votes to 4; and the Town Clerk was instructed to send a copy of it to the Gas Company. The public lamps have been unlighted pending the settlement of the dispute.

**Bangor Water Supply.**—Some time ago a debate took place in the Bangor City Council on a proposal to construct an additional reservoir for the storage of water; complaints having been made of a shortage of supply to the higher portions of the town. The proposers suggested that the new reservoir should be placed near the present one, close to the town; and it was estimated that the cost would be £14,000. A large proportion of the Council were strongly in favour of the scheme; but a minority argued so strongly against it that it was decided to obtain the opinion of an expert. The gentleman selected was Mr. Joseph Parry, the Water Engineer to the Liverpool Corporation, whose report has just been received. At present it is private; but his suggestions are stated to be very valuable from the point of view of the public health.

## New Water-Works for Penrith.

Last Wednesday, the Speaker of the House of Commons (the Right Hon. James W. Lowther) formally commenced the new water-works for Penrith, situated at Haweswater Tarn on the Westmorland Hills, five miles above Patterdale. The scheme is estimated to cost nearly £50,000. Mr. Lowther was presented with a silver spade by Mr. Baldwin Latham, the Engineer for the works; and he proceeded to cut the first turf. Having done so, he said Penrith could not be accused of undue haste in deciding its water question, having discussed various proposals for fifteen years. It was a somewhat singular circumstance that in Cumberland and Westmorland there should be water questions when they reflected that within 13 miles of the place was Styhead, the wettest place in Great Britain, which had an annual rainfall of 105 inches. It was astonishing that there should be need for impounding water for the use of the inhabitants. The necessity was accounted for by the very steep country, which caused it to flow away rapidly; and unless it was impounded droughts soon occurred. Towns and villages were constantly demanding better water supplies; and he could congratulate Penrith on having laid the first claim to so large a sheet of water. As time went on, many cities would want to take possession of some of their beautiful North Country lakes, as Manchester had already done with Thirlmere. Such supplies would become increasingly valuable; and Penrith was entitled to credit for having shown enterprise in promoting such a scheme as the one now started. The earliest part of the work would be very difficult; the pipe-line going along the face of the fells and over Boardale Pass into the next valley.

**New Water-Works at Gosforth.**—Work has just been begun on a new water scheme for the southern district of the Whitehaven Rural District Council. The site of the principal reservoir is at Scalefields, and is situated at an altitude of 500 feet above sea level. The cost of the scheme is estimated to be £14,100. The total length of the mains is about 24½ miles, of 5-inch, 4-inch, and 3-inch cast-iron pipes. There are about 3700 yards of collecting-pipes, with intake-tank and settling-wells at Gosforth. Mr. Harry W. Taylor, Assoc.M.Inst.C.E., of Newcastle-upon-Tyne, and Mr. George Boyd, the Surveyor to the Whitehaven Rural District Council, are the Engineers of the scheme.

**Mysterious Theft of Tubing at Mayfield.**—The following notice is being exhibited in the shop windows of Mayfield and neighbourhood: "£1 reward will be paid to the person who gives such information as will lead to the discovery or whereabouts of about 600 feet of 6-inch tubing, last seen near the natural gas borehole, Mayfield.—Apply to Secretary, East Sussex Gas and Water Company, Limited, 99, Cannon Street, London, E.C." The correspondent who sent us a copy of the notice remarks: "The Cannon Street people are doing East Sussex an injustice. The simple country folk hereabout may appropriate a truant rabbit or even higher game; but 7 tons cast main pipes! I fear the case is like much else from the same source—'wropped in mystery.'"

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## The Charge for Water in the City.

According to the "City Press," the legality of the charge now being made by the Metropolitan Water Board for the water supplied to premises in the City is to be tested on Thursday. It will be the culmination of a dispute between Mr. Vivian Samuel, of Gracechurch Street, and the Board—the latter body having issued a summons for money which they allege to be owing. Finding that water was to cost him more than £18 a year, against about £3 10s. which he formerly paid to the New River Company, Mr. Samuel, with about thirty other traders in the vicinity, had his water cut off, and now secures his supply from the Aldgate pump. Notwithstanding the fact that the water was cut off on the 10th of June, the Board sent him a bill up to Midsummer at the new rate. Mr. Samuel thereupon forwarded a cheque for the amount due at the old rate up to the time the water was cut off. This cheque the Board returned with the statement that the bill rendered must be paid in full. Under protest, Mr. Samuel sent another cheque for the full quarter's charge at the old rate. This was again returned, with the observation that the water-rate was due in advance, and that consequently Mr. Samuel owed the Board's full charge. At this stage a solicitor who was consulted pointed out that as the Act authorized the Board to impose any rate up to 5 per cent., they had the onus cast upon them of notifying the citizens what the new rate was to be. No notification having been made, the consumer was entitled to pay the old rate until the Board demanded a higher one. The money was thereupon tendered at the old rate in coin at Savoy Court, and the amount was accepted. The Board have nevertheless issued a summons. Mr. George Kebbell will appear for Mr. Samuel.

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**Devonport Water Supply.**—Devonport again found itself short of water last week, and the supply was cut off for several nights. The rain on Thursday, however, removed the cause of anxiety; and on Friday the full supply was resumed.

**South American Light and Power Company.**—At the meeting of this Company, last Friday, the Chairman (Mr. F. H. Jackson) congratulated the shareholders on the undertaking having entered the dividend-paying list; and if they had not had one or two exceptional items to meet, they would, he said, have been able to pay 3 instead of 2 per cent. on their capital. The turnover of the business had increased.

**Beverley Water Supply.**—The Water Committee of the Beverley Corporation have received reports from Mr. Percy F. Kendall, Professor of Geology in the University of Leeds, and Mr. Baldwin Latham, M.Inst.C.E., respecting the Pighill site for a new borehole for a fresh water supply. They do not consider it suitable, on account of the danger of percolation of surface water into the chalk formation; and the Professor recommends a site near Arram Railway Station, the water from which, on analysis, proved to be of a high degree of purity.

**Wrexham and East Denbighshire Water Company.**—At the ordinary meeting of this Company on the 11th inst., the Directors reported that the receipts on revenue account for the year ending the 30th of June showed an increase of £607, compared with those for the preceding twelve months. During the year the water was laid on to 99 houses; bringing up to 6629 the total number supplied. There was an expenditure of £6826 on capital account, which included payments in respect of the new reservoir at Ty Mawr and of extensions of mains now being carried out under an agreement with the Hawarden Rural District Council. The balance on the net revenue account was £8310; and dividends at the rates of £6 10s. per cent. per annum on the consolidated stock and £4 11s. per cent. per annum on the ordinary stock (all free of income-tax) were declared. Thanks were accorded to the Engineer and Secretary (Mr. F. Storr) and to the Accountant (Mr. R. Roberts) for their services during the year.

**Gas-Engine Explosion.**—An inquest was held last Tuesday on the body of George Hamblett, a mechanic at the Ramie Incandescent Mantle Company's works at Bredbury. Deceased, during the stoppage for the holidays, had been overhauling the gas-engine. Being unable to get it to start again, he decided to take out the piston-rod to see what was the matter. Difficulty was found in dislodging the cylinder, so, for the purpose of getting hold properly, he went round the engine, standing between the piston and the crank. He then gave the piston-rod a shake, when there was a flash and an explosion, and the piston came out with a full charge of gas behind it. The deceased was caught between the piston and the crank with terrific force, and his right leg was almost severed by the force of the impact. The unfortunate man died in the course of 15 minutes. In reply to the Factory Inspector, the Engineer of the works said he was not aware that there was any gas in the engine at the time of the accident; and he could not say whether a piece of grit in the cylinder caused a spark. Medical evidence showed that the cause of death was shock and bleeding; and the Jury returned a verdict to this effect.

**Deaths through Inhaling Gas.**—The death occurred at North Shields, last Wednesday, of Axel Emanuel Karlsen, a boarding-house keeper. Suspicions were aroused by the fact that he was not to be seen at nine o'clock, and the door of his room was broken in by his brother. Karlsen was found lying dead in bed, with one end of a rubber tube in his mouth, and the other attached to the gas-jet, the tap of which was open. A medical man who was called in found that the man had been asphyxiated by coal gas. An inquest was recently held at Redcar on the body of Margaret Coulthard (78), a widow living at Coatham. The evidence showed that deceased went to bed in her usual health on the night of the 14th inst., and two hours afterwards, when her granddaughter went into the room, gas was escaping, and her grandmother was in a state of collapse. A medical man who was called in found deceased suffering from the effects of poisoning by coal gas. He told the Jury that death was due to subsequent heart failure. One of the jurymen examined the bracket, and found that the gas-pipe was leaking. The granddaughter said the only explanation she could give was that her grandmother had smelt gas on entering the room, and, under the belief that she was turning it off, had really turned it slightly on. The Jury found that the gas poisoning was accidental.


CARRON

GAS COOKERS.

See that your Cooker bears this mark.

THE HALL MARK OF IRON GOODS.

CARRON COMPANY · ESTD PERPETUA · FOUNDED 1759 · INCORPORATED BY ROYAL CHARTER 1773 ·

It is a guarantee that you have the best.

Carron Company

INCORPORATED BY ROYAL CHARTER 1773

Works: CARRON, STIRLINGSHIRE.

In the two weeks ending the 19th inst., no fewer than 223 cookers were fixed by the Gas Committee of the Oldham Corporation.

The official opening of the works which have been constructed for bringing a supply of water to Coventry from Birmingham is to take place next month.

The Rathkeale Corporation have placed the order with Messrs. Robert Dempster and Sons, Limited, of Elland, for re-modelling the gas-works. The work includes retort-bench, purifiers, gasholder, &c.; and it has to be carried out under the supervision of Mr. Henry Hawkins, of Limerick.

The Egham and Staines Gas Company are extending their mains to Virginia Water for public lighting purposes. The usual objections have been made by some of the residents against the erection of the lamp-standards along the roads; but these have not had much weight, in view of the great benefits the public lighting scheme will bring to the people at large.

One of the unfilled public wells which supplied the residents in Portsmouth with water in the early years of the last century was recently discovered in the High Street, where the Water Company's employees have been engaged laying new mains. The well was about 8 feet in diameter and 18 feet deep, and there was 12 feet of water in it. The brickwork was in excellent preservation; and the well would doubtless have been as useful as of yore had the supply from Havant and Farlington not been so plentiful as it is. To prevent any possible danger from sinking, the well has since been filled in with earth and brick refuse.

There are probably few of our readers who were not familiar with the striking poster representing the capacity of a "Veritas" mantle in a street-lamp to withstand a blow from the ladder of a clumsy lamp-lighter. This picture has now given place to another bearing specially upon indoor lighting. Domestic servants, as a general rule, are not noted for the care with which they treat the articles they have to handle; and in the new picture this characteristic is well illustrated. A not very attractive-looking "slavey," while standing on the top of a pair of steps dusting the pictures, has managed to detach one and send it crashing down over the gas-bracket, on which is an incandescent gas-burner fitted with a "Veritas" mantle. The force of the fall has broken the glass chimney and pierced the picture; but withal the mantle is uninjured, to the manifest huge delight, but not surprise, in view of its "brand," of the domestic. A reproduction of the poster as a show-card has been prepared by the makers of the mantles (Messrs. Falk, Stadelmann, and Co., Limited), and copies are at the disposal of firms or others willing to exhibit them.

Changes of address are notified—of the Cowan Branch of Parkinson and W. & B. Cowan, Limited, from Westminster to Fitzalan Street Works, Kennington Road, S.E.; of Messrs. D. Anderson and Co., from No. 73 to Nos. 18 and 20, Farringdon Road, E.C.; and of Mr. H. Maisner (German incandescent gas-mantle importer), from Great Saffron Hill to No. 14, Thavies Inn, Holborn Circus, E.C.

A catalogue is to hand from Messrs. Joseph Shaw and Son, Limited, of Albert Works, Huddersfield, manufacturers of high-class steam-valves, boiler-mountings, and general engineering requisites. The firm's speciality is their valve for superheated steam; while hydraulic bronze castings and fine light iron castings are other goods for which they are held in high repute.

## APPLICATIONS FOR LETTERS PATENT.

16,782.—Goodson, J. H., "Gas pressure governor." Aug. 10.
16,859.—Tomkins, H., and Cooper, J., "Charging gas producers." Aug. 11.
16,924.—Radcliffe, J., "Purification of ammonia spent liquor." Aug. 12.
16,952.—Hathaway, A. H., and Round, E. D., "Lighting lamps and lanterns." Aug. 12.
16,963.—Frank, A., and Caro, N., "Manufacture of pure nitrogen from combustion gases." Aug. 12.
16,964.—Blakey, J., "Carburetting apparatus." Aug. 12.
16,979.—Gunning, J., "Supports for lanterns for gas lighting." Aug. 12.
16,989.—Stirling, R., "Carburetting air." Aug. 12.
17,003.—Pill, N. W., "Carburetting air, vaporizing liquids, and producing inflammable gas." Aug. 13.
17,007.—Nemerovsky, F., "Inverted incandescent gas-burner mantles." Aug. 13.
17,101.—Limebeer, A. J., and Limebeer, A. J., jun., "Coin-freed mechanism." Aug. 14.
17,103.—Wheeler, R. V., and Bone, W. A., "Gas producers." Aug. 14.
17,116.—Schultze, P., and Gaehde, T., "Gas-pressure indicators." Aug. 14.
17,125.—King, G., "Incandescent gas-lamps." Aug. 14.
17,148.—Fagerlund, E. A., "Automatic ignition and extinction of lamps." Aug. 14.
17,166.—O'Mullane, T., "Acetylene gas generator." Aug. 14.


## "ILLUMINATING TRUTHS."

### LEAFLETS FOR DISTRIBUTION.

No. 1.—"The Sanitary Aspects of Gas and Electric Lighting."
No. 2.—"The Cleanliness of Illuminants: The Eyesight."
No. 3.—"Fire Risks."
No. 4.—"The Relative Cost of Gas and Electricity, and Matters affecting it."
No. 5.—"On Reliability, with Instances of Misplaced Confidence."
No. 6.—"On Shop Lighting, with Special Reference to the Flame Arc Lamp."
No. 7.—"The Osram Lamp: Fiction and Fact."

*This series of Leaflets will be useful, not only for distribution among Householders generally, but for circulation among Shareholders to fortify them with arguments in defence of the commodity in which they have invested capital. Copies of each Leaflet should also be kept in every Gas Undertaking's Show-Rooms.*

*Prices for Quantities on Application to* WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.


## WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

**Situations Vacant.**

Water Engineer. Hull Corporation. Applications by Aug. 28.
Lecturer in Gas Distribution. Goldsmith's College. Applications by Sept. 1.
Retort-House Foreman. Wigan Gas-Works.
Working Manager. No. 4980.

**Situations Wanted.**

Assistant. No. 4981.
Chemical Plumber and Lead Burner. Davis, Shepherd's Bush.
Manager or Manager and Secretary. No. 4982.
Representatives. "S. N.," 56, City Road, E.C.

**Plant (Second-Hand), for Sale.**

Gas Exhauster. John Adams and Sons, Newcastle.
Mouthpieces. Walton-on-Thames Gas Company.
Retort Bench Mountings, Pipes, &c. Lochgelly Gas Company.
Street Lanterns and Pillars. Thirsk Gas Company.

**Stocks and Shares.**

East Hull Gas Company. Sept. 9.

**Patents to Sell or Licences to Manufacture.**

Gas Burners, &c. Cruikshank and Fairweather, Chancery Lane, W.C.
Improvements in Gas-Retort Charging Apparatus. Haseltine, Lake, and Co., Chancery Lane.
Revivification of Filtering Material. Haseltine, Lake, and Co., Chancery Lane.
Heating or Cooling Apparatus. Haseltine, Lake, and Co., Chancery Lane.
Incandescent Gas-Burners. Carpmael and Co., Southampton Buildings, W.C.
Improvements in the Oxidation and Distillation of Tar, &c., and Improvements in the Distillation of Hydrocarbons. Mewburn, Ellis, and Pryor, Chancery Lane, W.C.
Chimney Top. Skerrett, Birmingham.

**Gas Generators.**

Arrangements to Manufacture. Siche Gas Company, Limited, Canada.

**TENDERS FOR**

**Coal and Cannel.**

Rochdale Gas Department. Tenders by Aug. 26.
Rotherham Corporation. Tenders by Sept. 12.
Tenby Gas Consumers' Company.

**Oil for Gas Making.**

Rochdale Gas Department. Tenders by Aug. 26.

**Oxide of Iron.**

Edinburgh and Leith Corporations' Commissioners. Tenders by Sept. 14.
Solihull Gas Company. Tenders by Sept. 7.

**Pipes.**

Ramsgate Corporation. Tenders by Sept. 7.

**Coke.**

Ramsgate Corporation. Tenders by Sept. 7.


**OXIDE OF IRON.**

**O'NEILL'S OXIDE**
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

**SPENT OXIDE PURCHASED IN ANY DISTRICT.**

GAS PURIFICATION & CHEMICAL CO., LD.,
Palmerston House,
Old Broad Street, London, E.C.

**WINKELMANN'S**
**"VOLCANIC" FIRE CEMENT.**
Resists 4500° Fahr. Best for GAS-WORKS.
Andrew Stephenson, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

**J. & J. BRADDOCK (Branch of Meters** Limited), Globe Meter Works, Oldham, and 54 & 47, Westminster Bridge Road, London, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
Repairs receive prompt attention.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams:—
"Braddock, Oldham," and "Metrique, London."

**BENZOL**
AND
**CARBURINE FOR GAS ENRICHING.**

ALSO
**THE MAXIM PATENT CARBURETTOR.**

For Prices, &c., apply to
THE GAS LIGHTING IMPROVEMENT CO., LTD.,
7, Bishopsgate Street Without,
LONDON, E.C.
Telegraphic Address: "Carburine, London."

**OXIDE OF IRON.**
(NATURAL.)
SPENT OXIDE PURCHASED.
**BALE'S FIRE CEMENT.**
**PAINT FOR GAS-WORKS.**
**BALE & CHURCH,**
5, Crooked Lane, London, E.C.

**SULPHURIC ACID.**

**SPECIALLY prepared for the Manufacture of SULPHATE OF AMMONIA.**
**SPENCER CHAPMAN & MESSEL, LTD.,**
with which is amalgamated Wm. Pearce & Sons, Ltd.
36, Mark Lane, London, E.C. Works: Silvertown.
Telegrams: "Hydrochloric, London."
Telephone: 341 Avenue.

# NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

*No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.*

**COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.**

**Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.**

**Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.**

**TERMS OF SUBSCRIPTION to the "JOURNAL."**
**United Kingdom: One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.**
Payable in advance. If credit is taken, the charge is 25s. a year.
**Abroad (in the Postal Union): £1 7s. 6d., payable in advance.**

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
**Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.**


**ROBERT DEMPSTER & SONS, Ltd.,** Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

**LUX'S GAS PURIFYING MASS.** See Advertisement on p. 541. FRIEDRICH LUX, LUDWIGSHAFEN-AM-RHEIN.

**BY adopting Cripps's Bye-Pass Valves** inside your Purifiers, you can relieve the Back-Pressure in the Lower Tiers when the Purifying Material gets hard. They are extremely useful and economical. Sole Makers: C. & W. WALKER, LIMITED, Midland Iron-Works, Donnington, near Newport, SHROPSHIRE.

**BROTHERTON & CO., LIMITED.** Offices: City Chambers, LEEDS. Correspondence invited.

**D. ANDERSON AND COMPANY,** GAS LIGHTING ENGINEERS AND CONTRACTORS, 18 & 20, FARRINGDON ROAD, LONDON, E.C. Telegrams: "DACOLIGHT LONDON." Telephone: 2336 HOLBORN.

**SULPHURIC ACID for Sale, specially** suitable for making Sulphate of Ammonia. BROTHERTON AND CO., LTD., Chemical Manufacturers, Works: BIRMINGHAM, LEEDS, WAKEFIELD, and SUNDERLAND.

**TO Gas Managers, &c., Wanted, Old** Condemned GAS-METERS, from 1-light to 1000-light, for destruction to re-claim Metals. Write for Prices, Stating Quantities and Sizes, and if Wets or Drys. Scrap Metals, Drosses, Metal Shop Sweepings, &c., also bought J. WILSON, Pleasant Grove, York Road, King's Cross, LONDON, N.

**SULPHURIC ACID.**

**SPECIALLY prepared for Sulphate of** AMMONIA Makers by **CHANCE AND HUNT, LIMITED,** Works: OLDBURY, WEDNESBURY, AND STAFFORD. Address Correspondence and Inquiries to OLDBURY, WORCS. Telegrams: "CHEMICALS, OLDBURY."

**"VITERNUS" METALLIC PAINT FOR GAS-WORKS PLANT.**
**JOHN E. WILLIAMS AND CO.,** LOWER MOSS LANE, MANCHESTER, S.W. Telegrams: "ENAMEL." National Telephone 1759.

**GAS TAR wanted.** BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, WAKEFIELD, AND SUNDERLAND.

**HYDRATED OXIDE OF IRON.**
**PREPARED from Pure Iron.**
Twice as Rich as Bog Ore.
Gives no back Pressure.
The Cheapest in the Market.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

**GAZINE—A radical Solvent and Pre-** ventative of Naphthalene deposits, and the Automatic cleaning of Mains and Services. It is also used for the Enrichment of Gas, and has an illuminating value double that of 90 per cent. Benzol. Supplied by C. BOURNE, West Moor Chemical Works, KILLINGWORTH, or through his Agent, F. J. NICOL, Pilgrim House, NEWCASTLE-ON-TYNE. Telegrams: "DORIC," Newcastle-on-Tyne. National Telephone No. 2497.

**BRISTOL RECORDING GAUGES AND THERMOMETERS.**

**J. W. & C. J. PHILLIPS,** 23, COLLEGE HILL, LONDON, E.C., and 7, PARK SQUARE, LEEDS.

**THE KEITH LIGHT.**

5000 INSTALLATIONS NOW IN USE.
**SEE illustrated advertisement in next** week's issue.
JAMES KEITH AND BLACKMAN CO., LTD., 27, Farringdon Avenue, LONDON, E.C.

**AMMONIA.** Consumers in any form are invited to correspond with CHANCE AND HUNT, LTD., Chemical Manufacturers, OLDBURY, WORCS.

**PATENTS AND TRADE MARKS** PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d. MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 & 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

**SULPHATE OF AMMONIA** SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants. We guarantee promptness, with efficiency for Repairs. JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON. Telegrams: SATURATORS, BOLTON. Telephone 0848.

**AMMONIACAL Liquor wanted.** BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, WAKEFIELD, AND SUNDERLAND.

**GAS OILS.**
**MEADE-KING, ROBINSON, & CO.** Represent the Strongest Independent Refineries in America; also Petroleum Spirit for Gas Enrichment. 18, EXCHANGE STREET, MANCHESTER, and 11, OLD HALL STREET, LIVERPOOL.

**PINCHBECK'S Meters and Burglar** PROOF STRONG BOX. See illustrated advertisement, Aug. 18, p. I. of Centre. PINCHBECK LIMITED, Adams Place, George's Road, HOLLOWAY, N.

**R. & G. HISLOP**
GAS ENGINEERS, RETORT BUILDERS, CONTRACTORS, &c.
RETORT SETTINGS, COAL-TESTING PLANT, BOILER FIRING.
UNDERWOOD HOUSE, PAISLEY.

**FIDDES-ALDRIDGE**
**SIMULTANEOUS Discharging-Charger.** The one Machine which Discharges and Charges at One Stroke. See Advertisement, Aug. 18, p. III. of Centre. ALDRIDGE AND RANKEN, 9, VICTORIA STREET, WESTMINSTER, S.W. Telegrams: "MOTORPATHY, LONDON." Telephone: 5118 WESTMINSTER.

**THE British Bulk Creosote Company,** Borough Road, Weaste, MANCHESTER.

**J. E. C. LORD, Ship Canal Tar Works,** Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

**GAS PLANT for Sale—We can always** offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere. FIRTH BLAKELEY, SONS, AND COMPANY, LIMITED, Thornhill, DEWSBURY.

**AMMONIACAL Liquor wanted.** CHANCE AND HUNT, LTD., Chemical Manufacturers, OLDBURY, WORCS. Telegrams: "CHEMICALS."

**TEACHING BY CORRESPONDENCE.**
**MR. HERBERT LEES is open to pre-** pare Students, by Correspondence, for the "Gas Engineering" and "Gas Supply" Examinations of the City and Guilds of London Institute For Terms, &c., Apply to Elvaston Road, HEXHAM.

**WANTED, Position as Manager, or** MANAGER and SECRETARY, of Small Gas-Works (8 to 30 millions), or Gas and Water Works, by the Advertiser, who at present is very successfully Managing Gas-Works. Good Qualifications and Testimonials. Abstainer. Address No. 4982, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**WANTED, by an Energetic and Trust-** worthy Young Man (aged 33), with over Seventeen Years all-round Works and Office Experience, POSITION as GENERAL ASSISTANT to MANAGER, or HEAD CLERK. Capable of TAKING ENTIRE CHARGE. Knowledge of Drawing. Abstainer. Exceptional Testimonials. Address No. 4981, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

**CHEMICAL Plumber and Leadburner** of Thirty Years' Experience. Well up in Sulphate of Ammonia Plant, Quick Repairer, Good References, own Tools, Day or Piecework, Distance no object. Work Guaranteed. Address JOHN DAVIES, 23, Anley Road, SHEPHERD'S BUSH, W.

**REPRESENTATIVES calling on Gas** Companies, Architects, Surveyors, &c., can Considerably enhance their Income by carrying our "Tweedie Patent Regenerative Inverted Burner." Commission, 10 per cent. Particulars by letter from "S.N.," 56, City Road, E.C.


**COUNTY BOROUGH OF WIGAN.**
(GAS DEPARTMENT.)
**WANTED, a Retort-House Foreman.** For Particulars, apply, by letter only, to the undersigned. References, not Testimonials, to accompany Applications.
JOS. TIMMINS, M.Inst.C.E.,
Engineer and Manager.

**CITY AND COUNTY OF KINGSTON-UPON-HULL.**
APPOINTMENT OF WATER ENGINEER.
**THE Corporation are prepared to receive** APPLICATIONS for the Appointment of ENGINEER-IN-CHIEF to their Water-Works.
Preference will be given to an Engineer having a knowledge of Gas Manufacture.
The person appointed will be required to devote the whole of his time to the Service of the Corporation and not to engage, either directly or indirectly, in any other Profession or Business.
The Salary will be £500 per Annum.
The Water Supply of the City is obtained from Wells, Adits, and Bores; and an Engineer having Experience of large Pumping Engines will be preferred.
Applications, stating Age, Experience, and Qualifications, with *copies* or *prints* of not more than Three Testimonials, and marked "Water Engineer," should be sent to the undersigned before Ten A.M., on Friday, the 28th inst.
Canvassing will disqualify.
E. LAVERACK,
Town Hall, Hull, Town Clerk.
Aug. 7, 1908.

**UNIVERSITY OF LONDON, GOLDSMITHS' COLLEGE.**
(ENGINEERING DEPARTMENT.)
**LECTURER in Gas Distribution re-** quired for the Session September to May, 1908-9. The Lecturer must have a good Theoretical and Practical Knowledge of the Subject, and be Capable of making his Lectures and Demonstrations really useful to the Students, who will be mainly employees of Gas Companies. One evening per week, Thursday, 7-30 to 10.0., and about 28 evenings per Session. Salary £30. Apply before Sept. 1, 1908, stating Knowledge and Experience, to THE WARDEN, Goldsmiths' College, NEW CROSS, S.E.


**GAS Exhauster, by Bryan Donkin,** London, capacity 30,000 Cubic Feet per Hour, FOR DISPOSAL, in First-Class Order and Condition. Apply JOHN ADAMS AND SONS, Metal and Machinery Merchants, Dismantling and Salvage Contractors, M Dep., South Street, NEWCASTLE.

**FOR SALE—Complete lot of Retort** BENCH MOUNTINGS, HYDRAULIC MAIN, ASCENSION PIPES, Thirteen Self-Sealing RETORT MOUTHPIECES, &c., &c. Capital Condition.
Particulars from J. D. KEILLOR, Manager, Gas-Works, LOCHGELLY.

**FOR SALE—Thirty-Six 21 in. by 15 in.** Oval Self-Sealing MOUTHPIECES (Tangyes), for Horizontal Retorts.
Address T. PRICE, Engineer and Manager, Gas-Works, WALTON-ON-THAMES.

**STREET LANTERNS AND PILLARS.**

**FOR SALE—122 Copper 14-inch Street** LANTERNS, Opal tops, and 121 Cast-Iron PILLARS, with Cradles.
Apply to the THIRSK GAS COMPANY, Thirsk, YORKSHIRE.

**WE have the following New and Over-** hauled Second-Hand PLANT FOR SALE:—
Gasholders, 30 ft. by 12 ft. New Steel Tank.
" 35 ft. by 10 ft. Cast-Iron Tank.
" *45 ft. by 12 ft.
" *50 ft. by 16 ft.
" *50 ft. by 15 ft. 4 in. (Two-Lift)
*We can re-erect these in Brick or New Steel Tanks.
8-inch, 9-inch and 10-inch Condensers.
New "Cripps" Washer (8-inch), 150,000, c.f. per day.
Walker's Purifying Machine.
Exhausters and Engines, Single and Combined, 2000 to 60,000 feet per hour.
Cast-Iron Tower Scrubber, 7 ft. diameter, 55 ft. high.
Purifiers, sets 6-fts., 10-fts., 12-fts., and 20-fts.
Plans and Quotations of new Sets.
6-inch to 18-inch Station Meters, Governors, &c.
Tar and Liquor Pumps.
Producer-Gas Plants for 150 to 300 H.P.
Boilers, Tanks, and all requisites for Gas-Works.
FIRTH BLAKELEY, SONS, AND COMPANY, LIMITED, Gas Engineers, Thornhill, DEWSBURY (Yorks.).

**EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.**

**THE Commissioners are prepared to** receive TENDERS for the Supply of about 500 Tons of OXIDE OF IRON, suitable for Gas Purification Purposes, delivered into Waggons, ex Ship Granton Harbour, Free of all Charges, or in Railway Waggons (North British or Caledonian Railways), Granton Gas-Works.
Any further Information may be obtained upon Application to Mr. W. R. Herring, General Manager, Gas-Works, New Street, Edinburgh.
Tenders to be lodged at or before Ten a.m. on Monday, the 14th day of September, 1908, sealed and endorsed "Tender for Oxide of Iron," and addressed to the undersigned.
The Commissioners do not bind themselves to accept the lowest or any Offer.
JAMES MCG. JACK,
25, Waterloo Place, Clerk.
Edinburgh.

**COUNTY BOROUGH OF ROTHERHAM.**

**THE Gas Committee invite Tenders for** the Supply of 18,000 Tons of Screened COAL, PEA, and LARGE NUTS, up to June 30, 1909.
Tenders to be sent to the undersigned not later than Sept. 12 next, endorsed "Tender for Gas Coal."
Firms whose Tenders are accepted will be required to enter into Contracts which will contain the Fair Contracts Clause.
The Committee do not bind themselves to accept the lowest or any Tender.
Tender Forms and Particulars can be obtained from
J. S. NAYLOR,
Gas Engineer, Rotherham.
Gas Offices, Frederick Street,
Rotherham, Aug. 20, 1908.

**RAMSGATE CORPORATION.**
(GAS AND WATER DEPARTMENT.)

TENDERS FOR CAST-IRON, WROUGHT-IRON, OR STEEL WATER-PIPES.

**THE Gas and Water Committee invite** TENDERS for the Supply of:—
3200 Lineal Yards of 4-inch WATER-PIPES.
800 do. 3-inch do.
Together with Sundry Ordinary Specials.
The Pipes tendered for may be either Cast-Iron, Wrought-Iron, or Steel.
Tenders to be sent in addressed to the Chairman of the Gas and Water Committee, Gas and Water Offices, Boundary Road, Ramsgate, on or before Monday, Sept. 7, 1908, endorsed "Tender for Pipes."
The Committee do not bind themselves to accept the lowest or any Tender.
Further Particulars on Application to the undersigned.
WILLIAM THOMSON,
Engineer and Manager.
Gas and Water Offices,
Ramsgate, August, 1908.

**RAMSGATE CORPORATION.**
(GAS AND WATER DEPARTMENT.)

**THE Committee invite Tenders for the** Purchase of the whole of their Surplus COKE (estimated at from 1500 to 2500 Tons), or for quantities of not less than 200 Tons per Annum, from the 1st of October, 1908, to the 30th of September, 1909, delivered Free on Rail or Barge Ramsgate, or Free into Carts at the Gas-Works, Ramsgate; Purchaser in any case to pay dues.
Further Particulars, together with Conditions and Form of Tender, may be obtained from the undersigned.
Tenders to be sent in not later than Noon on Monday, Sept. 7, 1908, addressed to the Chairman of the Gas and Water Committee, Boundary Road, Ramsgate, endorsed "Tender for Coke."
The Committee do not bind themselves to accept the highest or any Tender.
WILLIAM THOMSON,
Engineer and Manager.
Gas and Water Offices,
Boundary Road, Ramsgate,
August, 1908.

**THE Tenby Gas Consumers' Company,** Limited, are prepared to receive TENDERS for the Supply of 2000 Tons of GAS COAL and 1000 Tons of HOUSE COAL for delivery during the ensuing Twelve Months from Sept. 1.
For Forms of Tender and further Particulars Apply to Mr. ALFRED H. BROOKMAN, Engineer and Manager, Gas-Works, TENBY.

**BOROUGH OF ROCHDALE.**

TO COAL PROPRIETORS AND OTHERS.

**THE Gas and Electricity Committee of** the above Corporation invite TENDERS for the Supply of 50,000 Tons of Best GAS COAL (Screened, Unscreened, or Nuts), to be delivered over a period of Ten Months from Sept. 1, 1908.
Forms of Tender and any other Information may be obtained on Application to Mr. T. Banbury Ball, the Manager, at the Gas-Works, Dane Street.
Sealed Tenders, addressed to the Chairman of the Gas and Electricity Committee, and endorsed "Tender for Gas Coal," must be sent in to me not later than Noon on Wednesday, Aug. 26, 1908.
By order,
WM. HENRY HICKSON,
Town Clerk.
Town Hall, Rochdale,
Aug. 6, 1908.

**BOROUGH OF ROCHDALE.**

GAS OIL.

**THE Gas and Electricity Committee of** the above Corporation invite TENDERS for the Supply of 600 Tons of OIL suitable for the Manufacture of Carburetted Water Gas, to be delivered over a period of Six Months from Oct. 1, 1908, in about equal weekly quantities.
A Gallon Sample of the Oil offered must be sent to Mr. T. Banbury Ball, the Manager, at the Gas-Works, Dane Street, prior to the date fixed for the receipt of Tenders.
Sealed Tenders, addressed to the Chairman of the Gas and Electricity Committee, and endorsed "Gas Oil," must be sent in to me not later than noon on Wednesday, Aug. 26, 1908.
By order,
WM. HENRY HICKSON,
Town Clerk.
Town Hall, Rochdale,
Aug. 6, 1908.

**SOLIHULL GAS COMPANY.**

**TENDERS are invited for the Supply of** about 50 Tons of OXIDE OF IRON, suitable for Gas Purification, delivered free to Solihull Great Western Railway Station.
Tenders, endorsed "Tender for Oxide of Iron," to reach me on or before Monday, Sept. 7, 1908.
The lowest or any Tender not necessarily accepted.
R. H. AINSWORTH,
Manager.
Gas-Works, Solihull,
near Birmingham.

**THE Proprietor of the Patent No. 11,145,** of 1901, for "IMPROVEMENTS IN GAS RETORT CHARGING APPARATUS," is desirous of entering into Arrangements by way of LICENSE and Otherwise on Reasonable Terms for the purpose of EXPLOITING the same and ensuring its full Development and Practical Working in this Country. All communications should be addressed in the first instance to—
HASELTINE, LAKE, AND CO., Chartered Patent Agents and Consulting Engineers, 7 & 8, Southampton Buildings, Chancery Lane, LONDON, W.C.

**THE Proprietor of the Patent No. 20,303,** of 1902, for "METHOD OR PROCESS FOR THE REVIVIFICATION OF FILTERING MATERIALS," is desirous of entering into Arrangements by way of LICENSE and otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring its full Development and Practical Working in this Country.
All Communications should be addressed in the first instance to—
HASELTINE, LAKE, AND CO.,
Chartered Patent Agents and Consulting Engineers,
7 & 8, Southampton Buildings, Chancery Lane,
LONDON, W.C.

**THE Proprietor of the Patent No. 22,560,** of 1903, for "IMPROVEMENTS IN HEATING OR COOLING APPARATUS," is desirous of entering into Arrangements by way of LICENSE and otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring its full Development and Practical Working in this Country.
All Communications should be addressed in the first instance to—
HASELTINE, LAKE, AND CO.,
Chartered Patent Agents and Consulting Engineers,
7 & 8, Southampton Buildings, Chancery Lane,
LONDON, W.C.

**TO GAS LIGHTING ENGINEERS.**

**THE Proprietors of Patent No. 2980 of** 1906, relating to "INCANDESCENT GAS BURNERS," desire to enter into Negotiations with one or more Firms in Great Britain for the Grant of LICENSES to MANUFACTURE under ROYALTY.
Inquiries to be addressed to MESSRS. CARPMAEL AND CO., 24, Southampton Buildings, LONDON, W.C.

**THE Proprietor of Letters Patent No.** 15,551 of 1903, relating to "GAS BURNERS," desires to DISPOSE of the Patent or to Grant LICENSES to Interested Parties on Reasonable Terms.
Inquiries to be addressed to CRUIKSHANK AND FAIRWEATHER, LIMITED, 65-66, Chancery Lane, LONDON, W.C.

**L. SEPULCHRE, of Herstal-lez-Liege,** Belgium, the Proprietor of British Patent No. 2503 of 1906, for "A DRAUGHT INDUCING TOP FOR CHIMNEYS, &c.," is desirous of entering into Arrangements with British Manufacturers with a view to the SALE or COMMERCIAL EXPLOITATION of the Invention protected by the above Letters Patent.
Interested parties are invited to Communicate with the undersigned for further Particulars.
HENRY SKERRETT, Chartered Patent Agent, 24, Temple Row, BIRMINGHAM.

**TO GAS COMPANIES AND MANUFACTURERS OF PATENT FUEL.**

**THE Owners of the following British** Patent, viz., No. 16,182 of 1905, for "IMPROVEMENTS IN OR RELATING TO THE OXIDATION AND DISTILLATION OF TAR, NAPHTHA, AND LIKE HYDROCARBONS," and No. 28,689 of 1906, for "IMPROVEMENTS RELATING TO THE DISTILLATION AND PARTIAL DEHYDROGENATION OF HYDROCARBONS," are desirous of entering into Negotiations for the EXPLOITATION of these PATENTS with Interested Firms.
Address inquiries to MEWBURN, ELLIS, AND PRYOR, Chartered Patent Agents, 70 & 72, CHANCERY LANE, W.C.

**WE Hereby Give Notice that we have** made Arrangements with Henry Mothersole, Broomfield Road, Chelmsford, Essex, to MANUFACTURE and fill all Orders for the SICHE GAS GENERATORS, under Patent No. 11,495, 1902.
For further Information, apply to the above, or the SICHE GAS COMPANY, LIMITED, Georgetown, Ontario, CANADA.

By order of the Directors of the
**EAST HULL GAS COMPANY.**

**MESSRS. W. N. LEWENDON & SONS** will SELL BY AUCTION, at their Estate Mart, 4, Parliament Street, Hull, on Wednesday, the 9th of September, 1908, at Half-past Two o'clock in the Afternoon, £12,615 FIVE PER CENT. ORDINARY STOCK of the East Hull Gas Company, in lots of not more than £100 nominal value.
Since the year 1867, the Company has without intermission paid the maximum Dividend allowed by Parliament.
A Deposit of £10 per cent. on the nominal amount of Stock purchased must be paid at the close of the Sale.
The Company's Maximum Price of Gas is Four Shillings per 1000 Cubic Feet within, and Four Shillings and Sixpence outside, the Municipal Borough.
The Price now charged throughout the whole Area of Supply is Two Shillings and Three Pence per 1000 Cubic Feet, less Discounts of 5 per cent. and 7½ per cent., according to Consumption.
The Increase in the Sale of Gas for the Year ended the 31st of December, 1907, over the year 1906 was 13 per cent.
Particulars of Sale may be obtained on Application to the Auctioneers, Estate Mart, 4, Parliament Street, Hull, or from the Offices of the Company after the 25th inst.
DAVID WOOD,
Secretary.
Offices, St. Mark Street, Hull,
Aug. 20, 1908.

**SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.**

**MESSRS. A. & W. RICHARDS beg to** notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.
Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to MESSRS. A. & W. RICHARDS, at 18, FINSBURY CIRCUS, E.C.

**THOMAS DUXBURY & CO.,**
**16, DEANSGATE, MANCHESTER.**

Best Gas Coal and Cannel, giving High Illuminating Power, Large Yield per ton, and reasonable in Price.

**Telegrams: "DARWINIAN, MANCHESTER."**
**Telephone 1806.**

# JAMES OAKES & CO.,

**ALFRETON IRON-WORKS, DERBYSHIRE,**
AND
**Wenlock Iron Wharf, 21 & 22, Wharf Road,**
**CITY ROAD, LONDON, N.**

Manufacture and keep in Stock at their Works (also large Stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible.